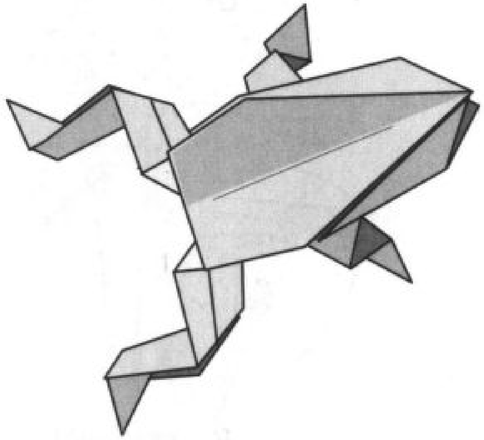
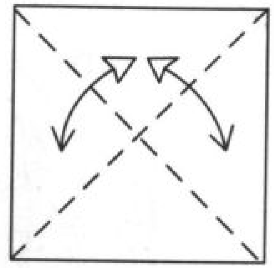
Frog



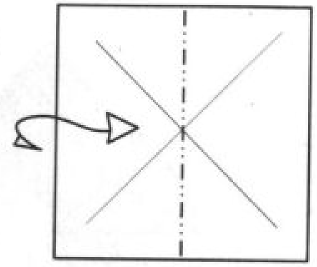
Frogs (order *Anura*) are found throughout the world. They range in size from half an inch to almost a foot. They feed on insects and other small animals which they catch with their long sticky tongues.

1



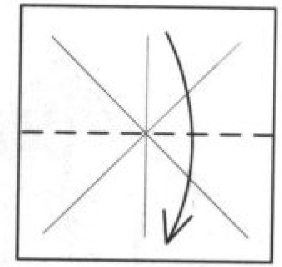
Fold and unfold.

2

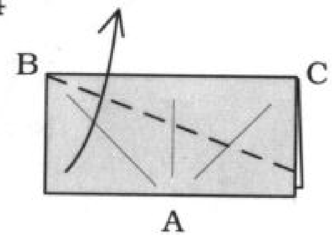


Fold behind and unfold.

3

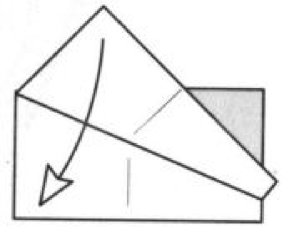


4



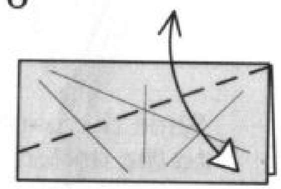
Fold up so that point A lies along line B–C.

5



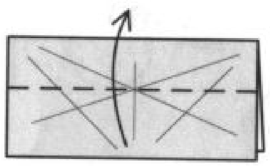
Unfold.

6

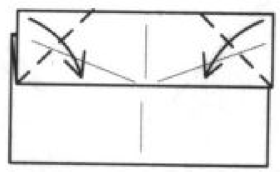


Fold and unfold.

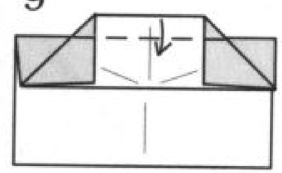
7



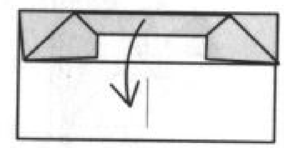
8



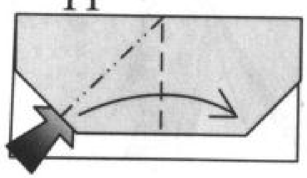
9



10

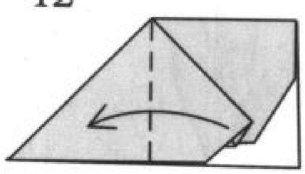


11

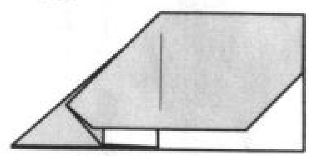


Squash-fold.

12

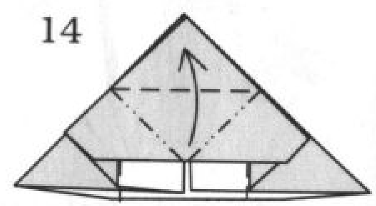


13



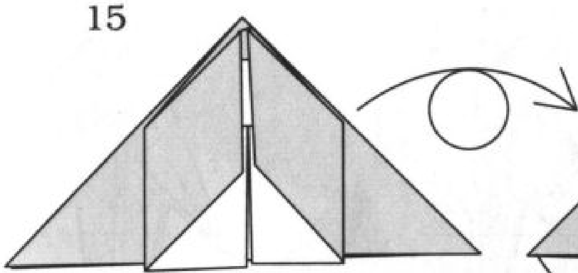
Repeat steps 11–12 on the right.

14

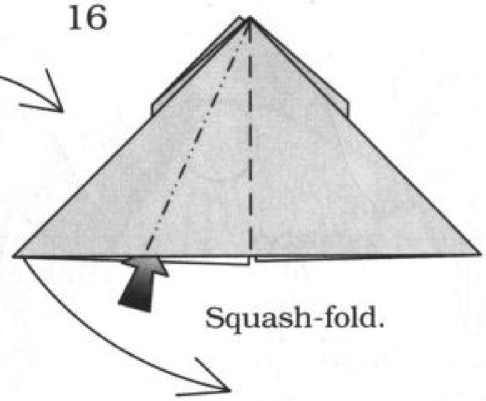


Petal-fold.

15

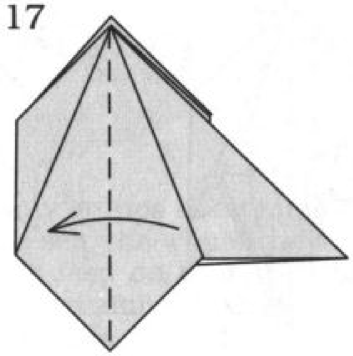


16

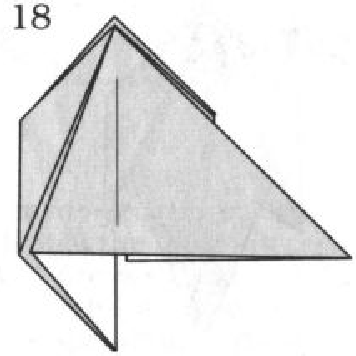


Squash-fold.

17

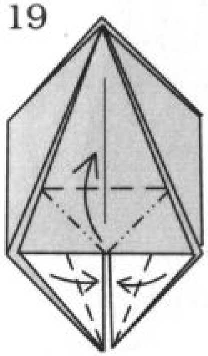


18



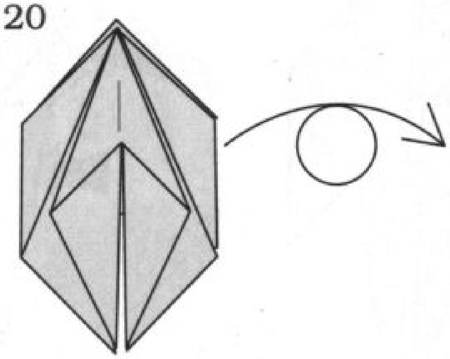
Repeat steps 16–17
on the right.

19

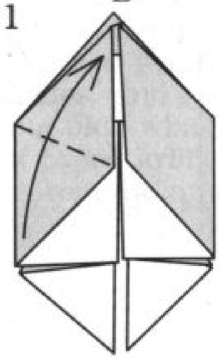


Petal-fold.

20

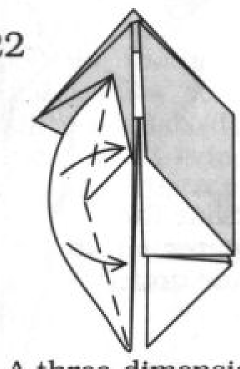


21



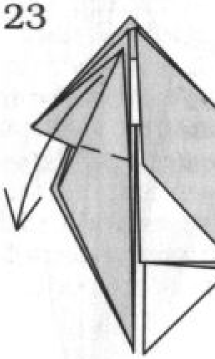
Fold A to B.

22

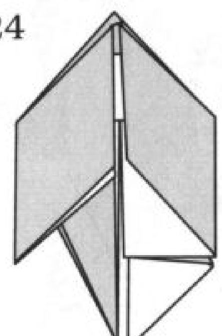


A three-dimensional
intermediate step.

23

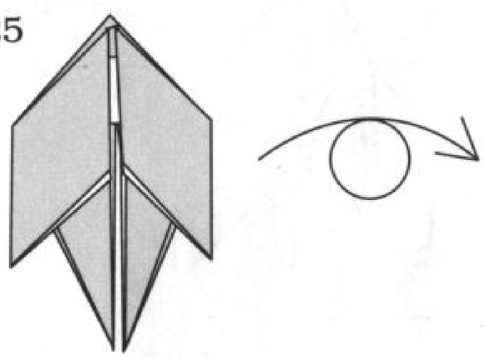


24

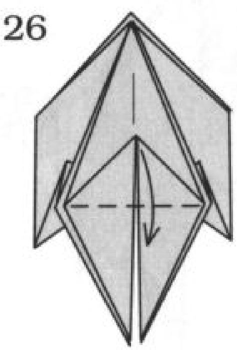


Repeat steps 21–23
on the right.

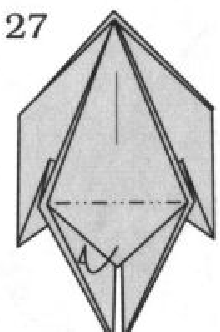
25



26

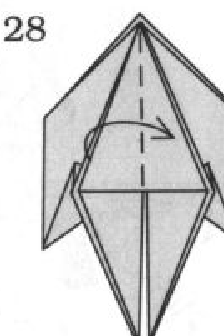


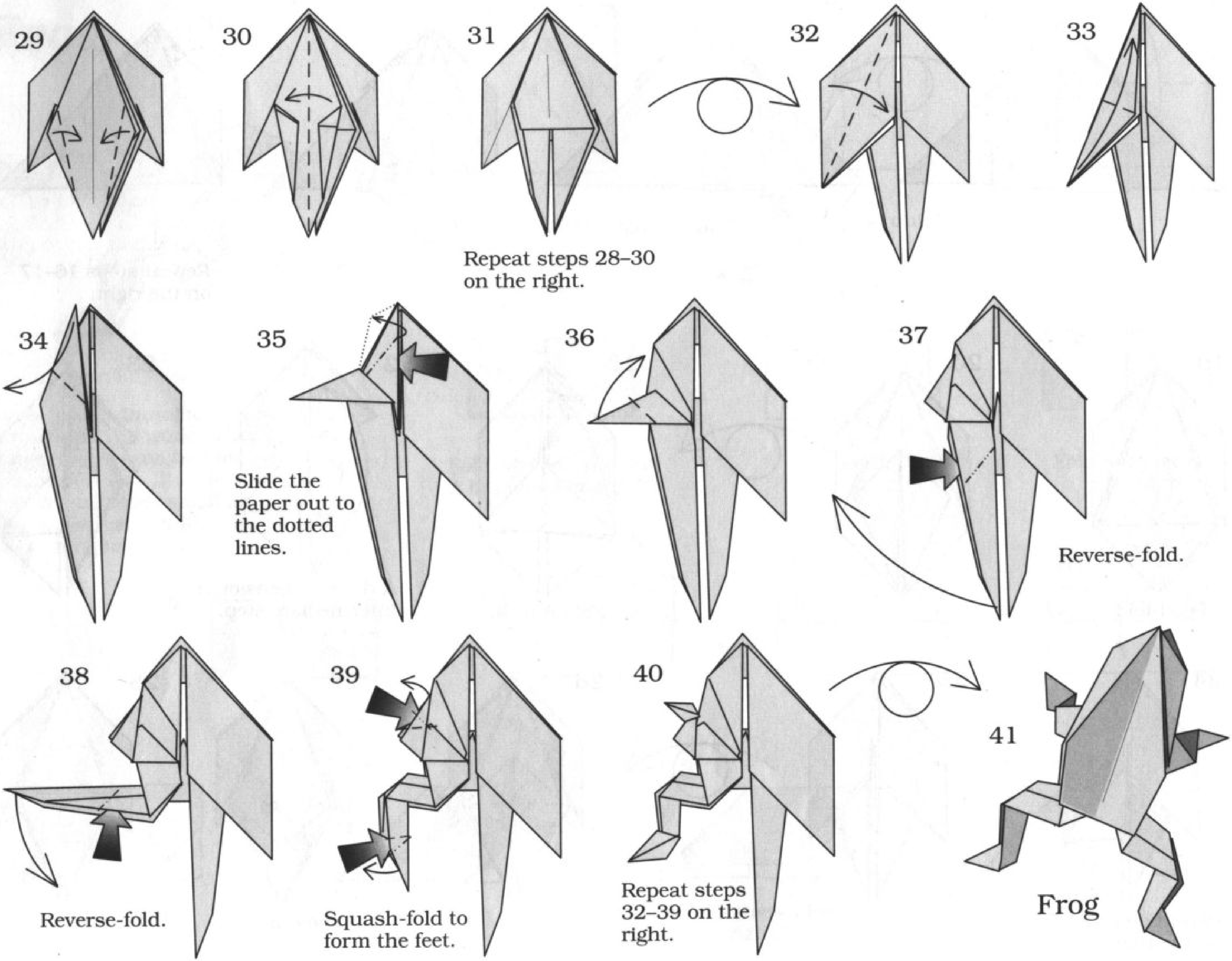
27



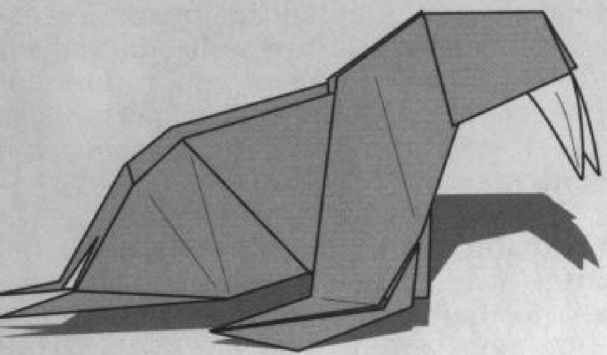
Fold inside.

28



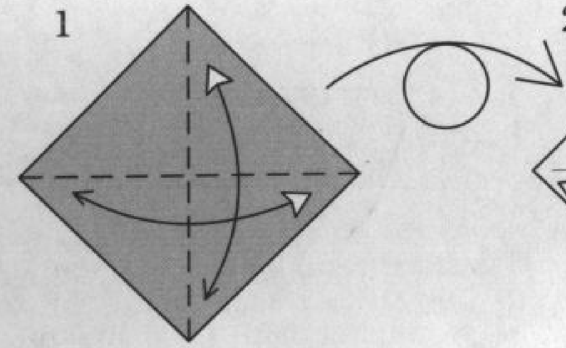

29
30
31
Repeat steps 28–30
on the right.
32
33
34
35
Slide the
paper out to
the dotted
lines.
36
37
Reverse-fold.
38
Reverse-fold.
39
Squash-fold to
form the feet.
40
Repeat steps
32–39 on the
right.
41
Frog

Walrus



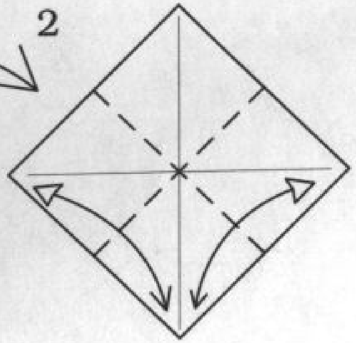
The Walrus (*Odobenus rosmarus*) is one of the most comical-looking animals in the world. With his oversize tusks and bushy moustache, the male walrus resembles an old sea captain. Although walruses seem very lethargic sprawled on northern beaches and iceflows, they are actually capable of great speed on land as well as in the water. They feed primarily on fish and shellfish and may grow up to 15 feet long.

1



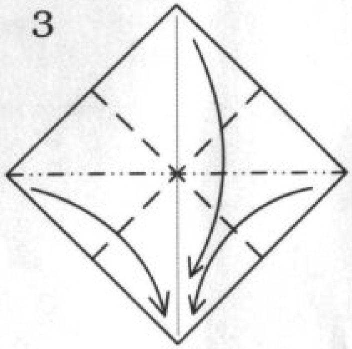
Crease the diagonals.
Turn the paper over.

2



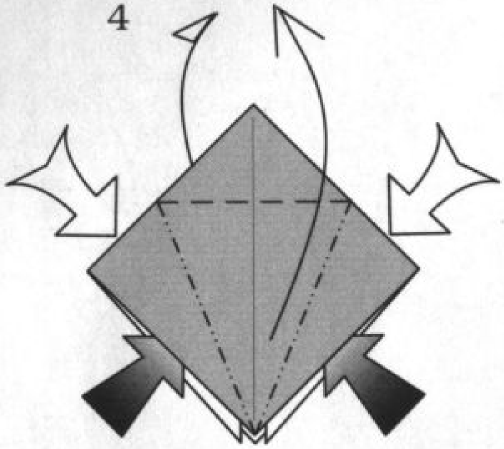
Fold and unfold.

3



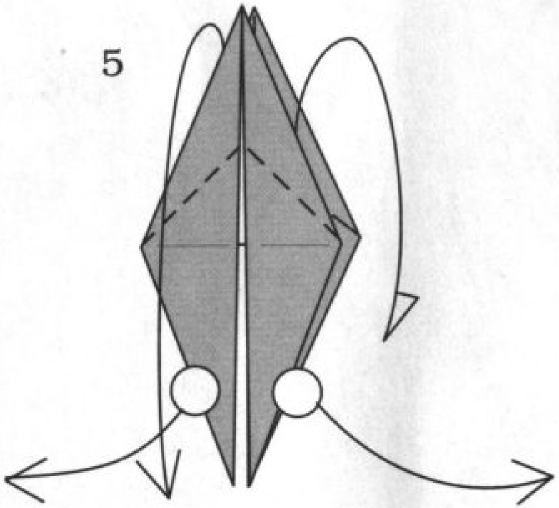
Make a Preliminary Fold.

4



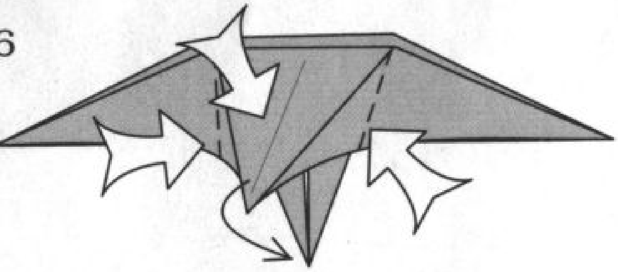
Petal-fold in front and back to make a Bird Base.

5



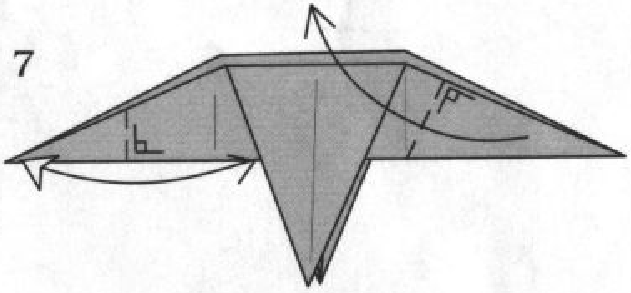
Hold each of the two bottom flaps and pull them out to the sides. Simultaneously, swing the top flap down.

6



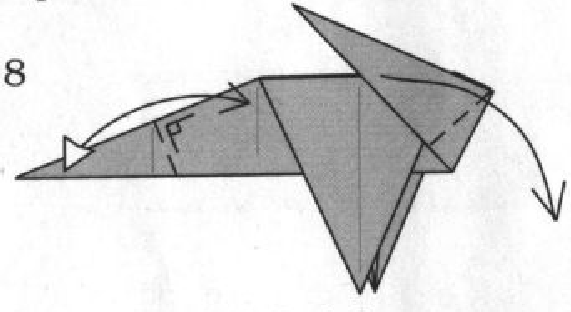
Flatten it out.

7



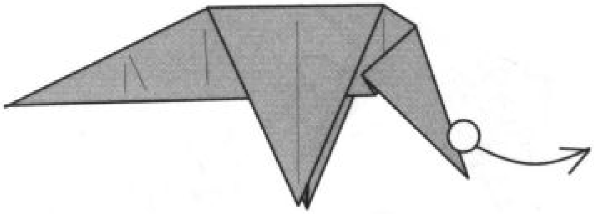
Fold and unfold.

8



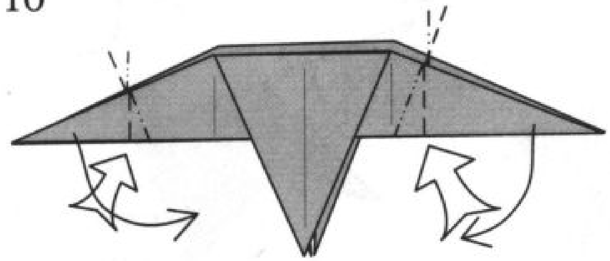
Fold and unfold the left point; fold the right point down.

9



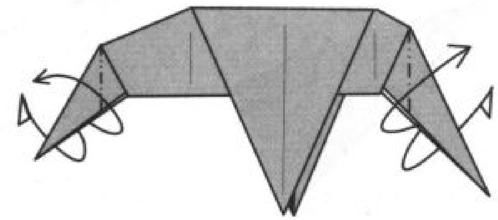
Unfold.

10



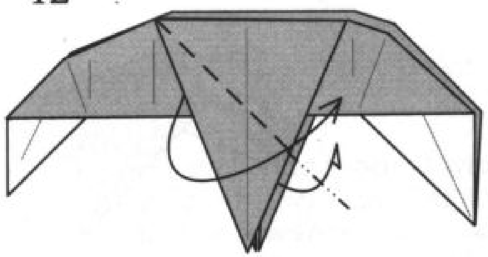
Crimp each side on existing creases.

11



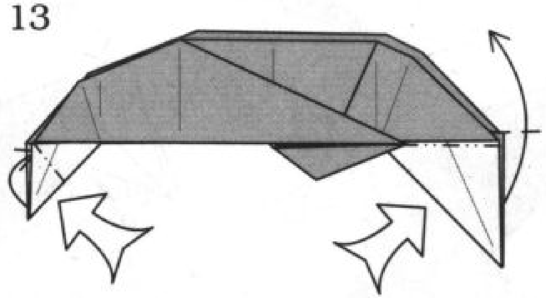
Pull out one layer from each side.

12



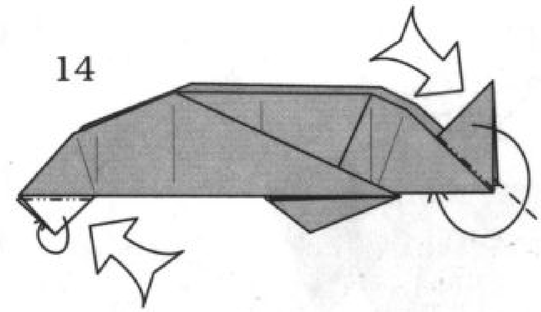
Fold the front and back points as far to the right as possible.

13



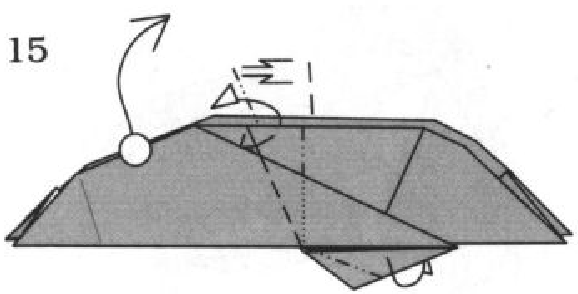
Reverse-fold.

14



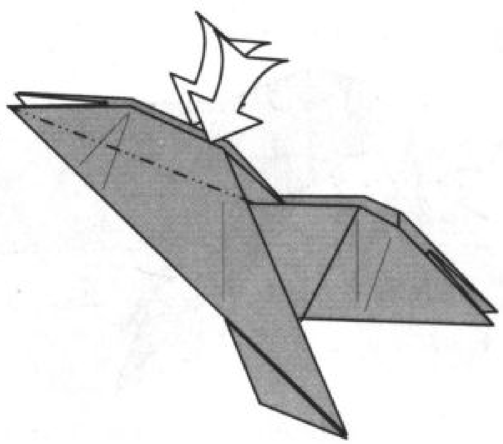
Reverse-fold.

15



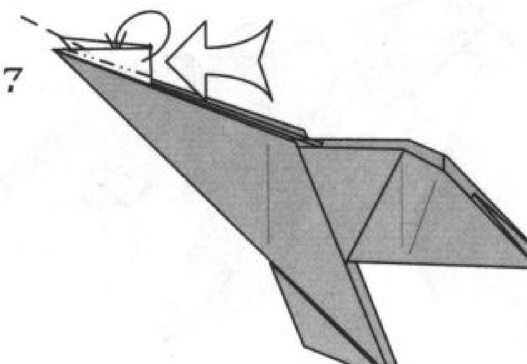
Crimp the body.

16



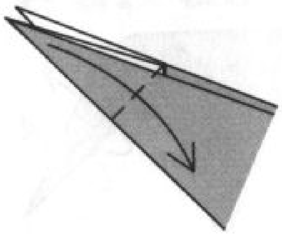
Closed-sink two layers.

17



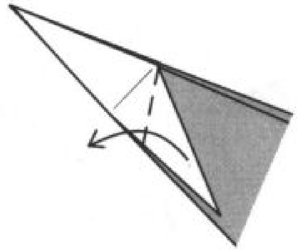
Reverse-fold.

18



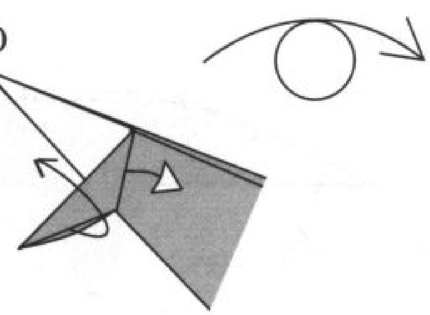
Fold one point down as far as possible.

19



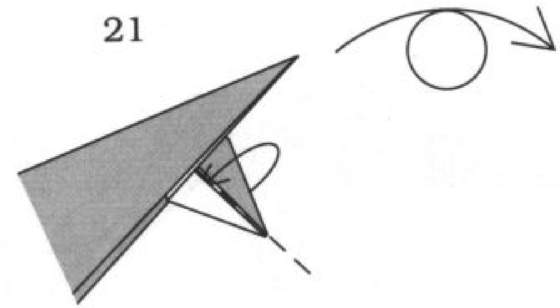
Fold it back to lie along the existing crease.

20



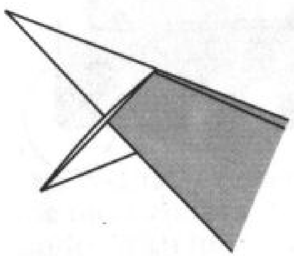
Wrap two layers to the left. Turn the paper over.

21



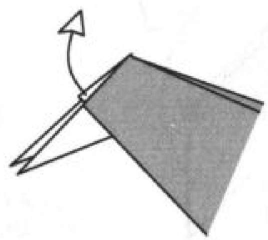
Tuck both layers into the pocket. Turn the paper over.

22



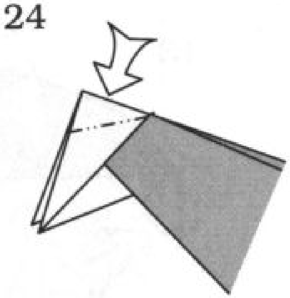
Repeat steps 19-21 on the other side.

23



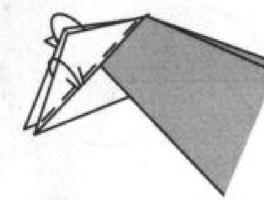
Pull out the middle layer.

24



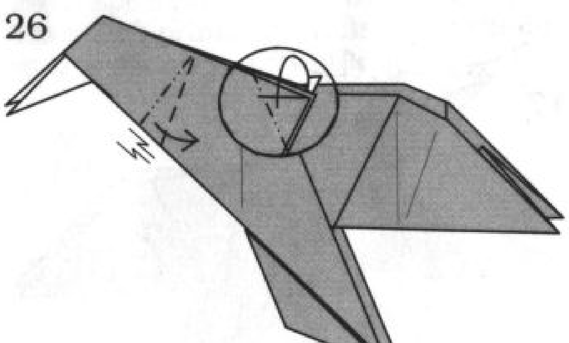
Reverse-fold on an existing crease.

25



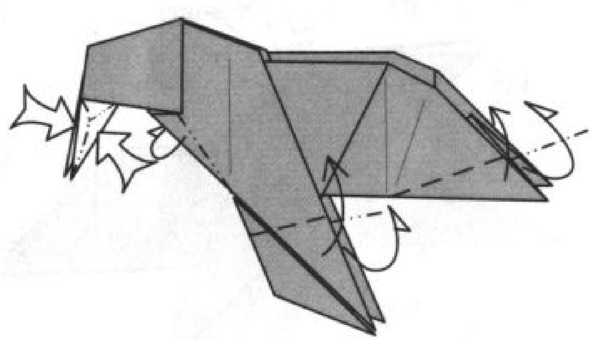
Tuck both sides into pockets.

26



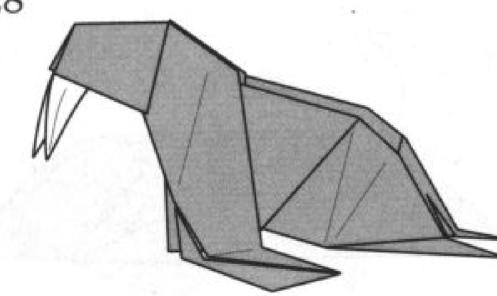
Mountain-fold the points inside the back and crimp the head down.

27



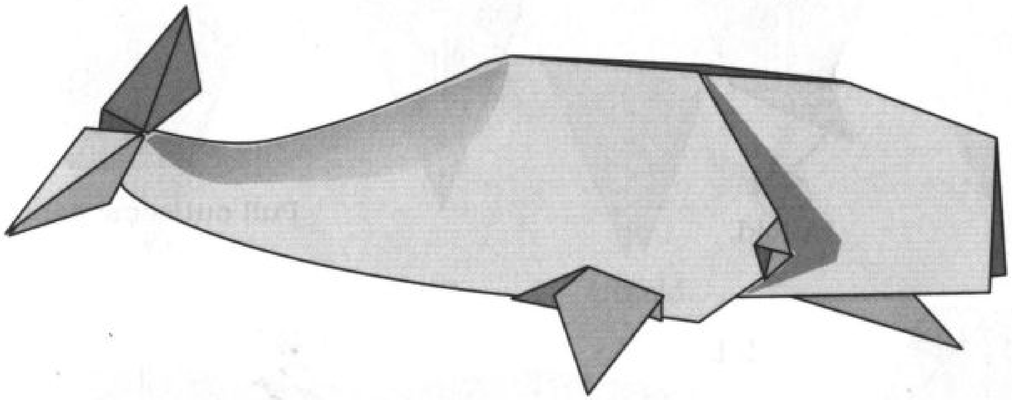
Pinch the tusks. Narrow the neck with mountain folds. Fold the flippers outwards.

28

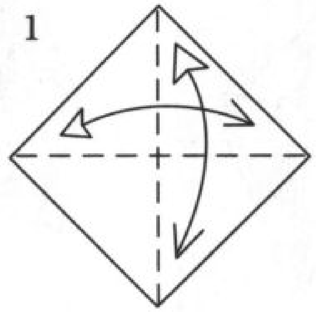


Walrus

Sperm Whale

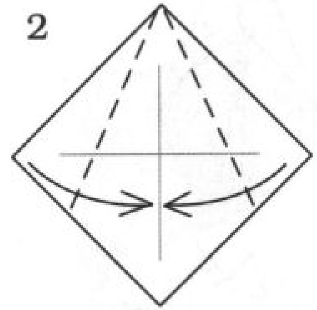


1



Fold and unfold.

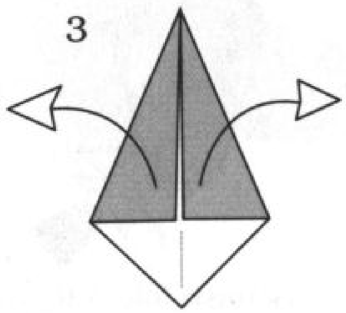
2



Kite fold.

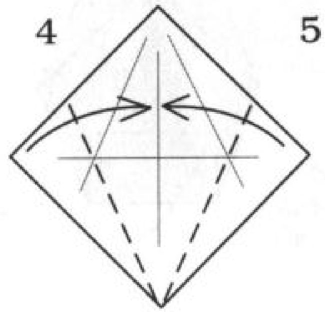
These 60-foot-long toothed whales have teeth only on their lower jaw. Traveling in herds of 20 to 50, they migrate towards the equator in winter. They feed mainly on giant squid which they can detect with their sonar system. The sperm whale (*Physeter macrocephalus*) is dark gray. Often it is found with white marks and scars on the head from fighting the giant squid.

3



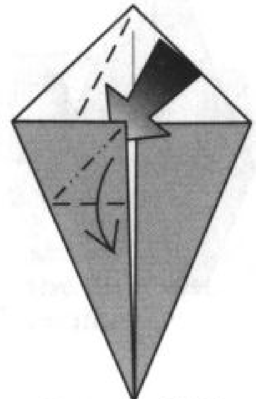
Unfold.

4



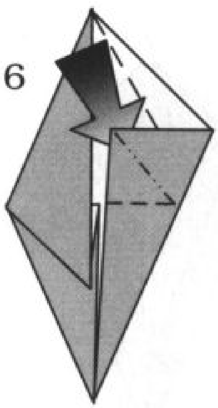
Kite-fold.

5



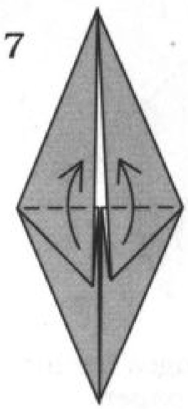
Squash-fold.

6

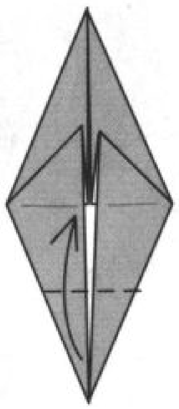


Squash-fold.

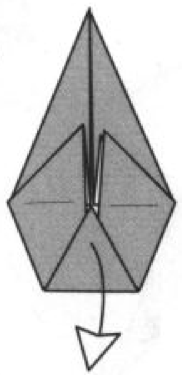
7



8

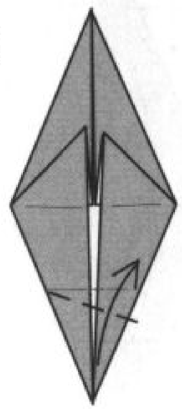


9

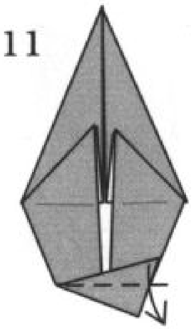


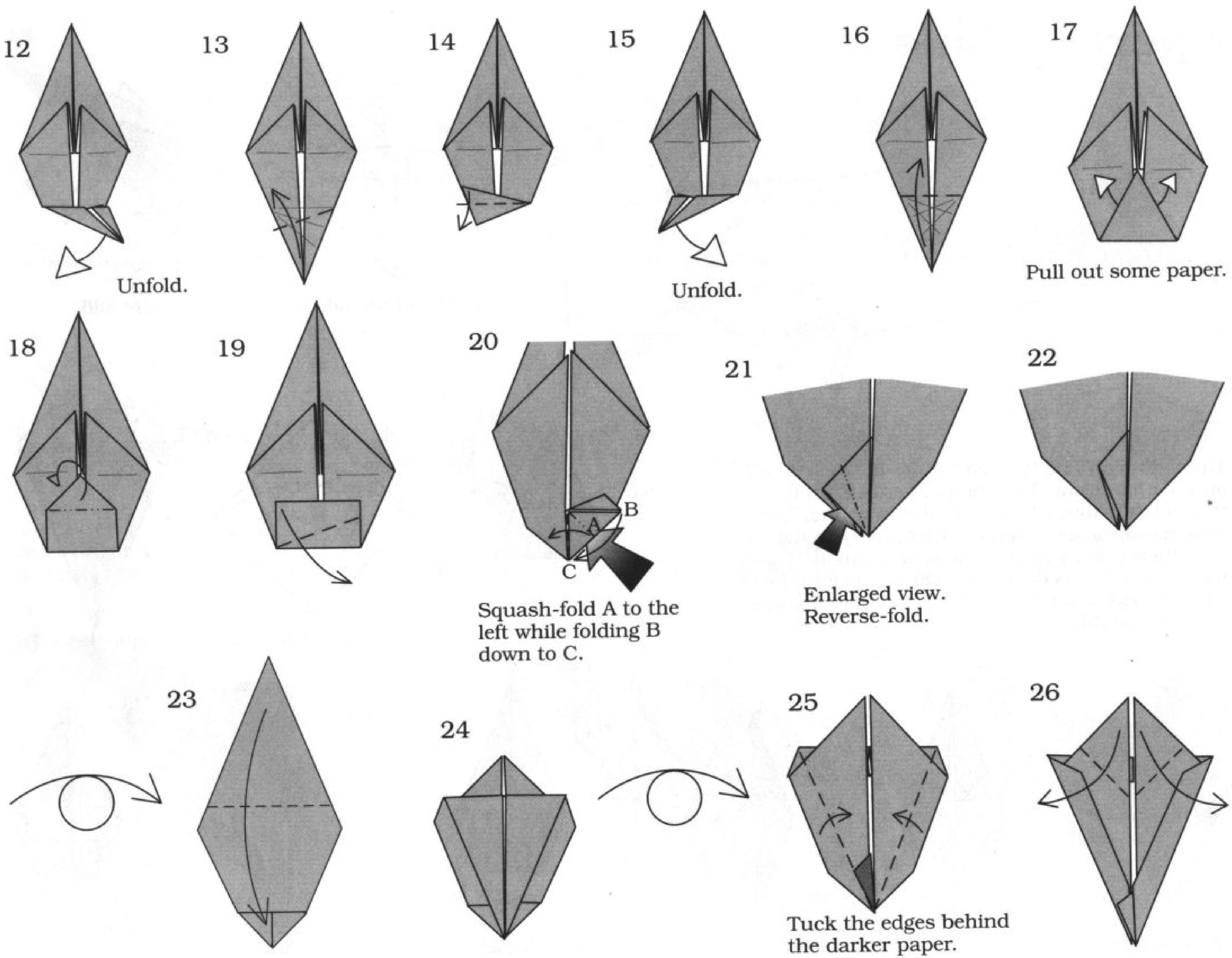
Unfold.

10

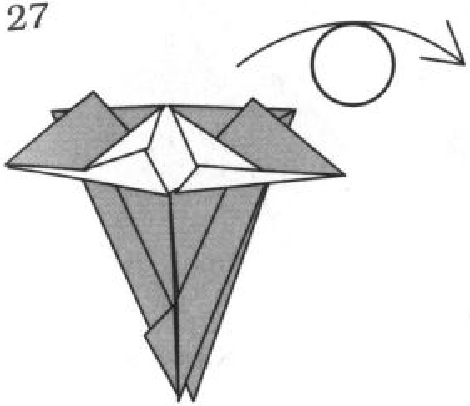


11

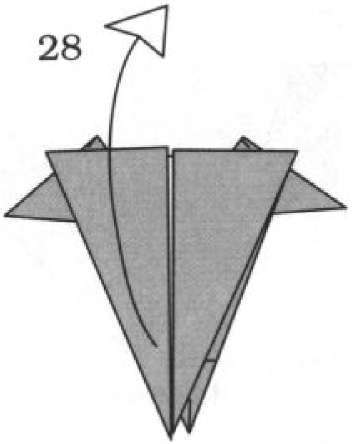



12
Unfold.
13
14
15
Unfold.
16
17
Pull out some paper.
18
19
20
A
B
C
Squash-fold A to the left while folding B down to C.
21
Enlarged view.
Reverse-fold.
22
23
24
25
Tuck the edges behind the darker paper.
26

27

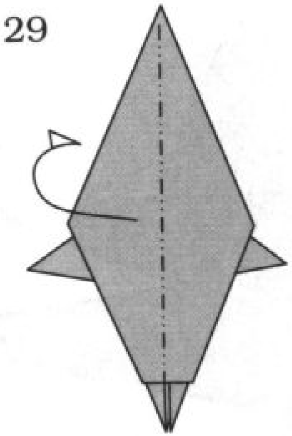


28

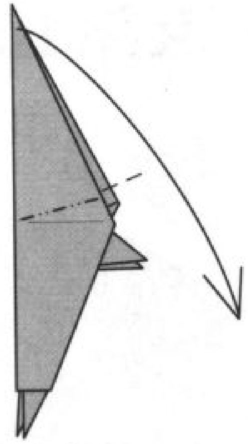


Unfold.

29

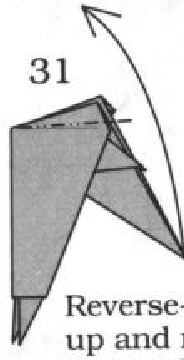


30



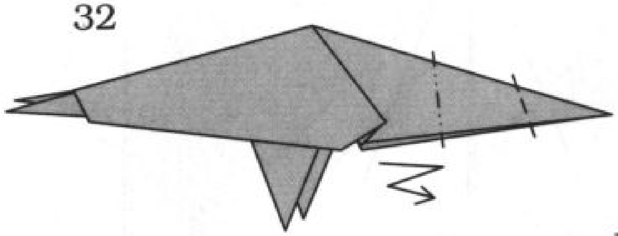
Reverse-fold.

31



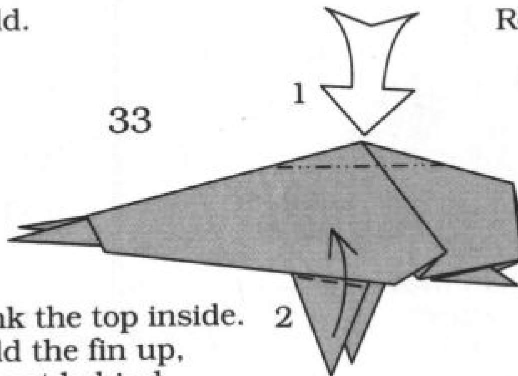
Reverse-fold up and rotate the model.

32



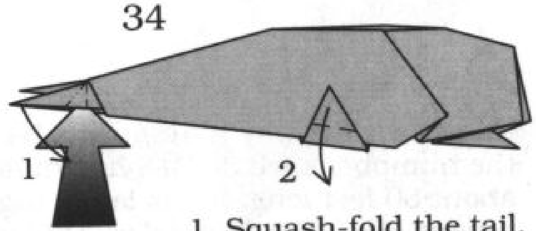
Crimp-fold to form the mouth.

33



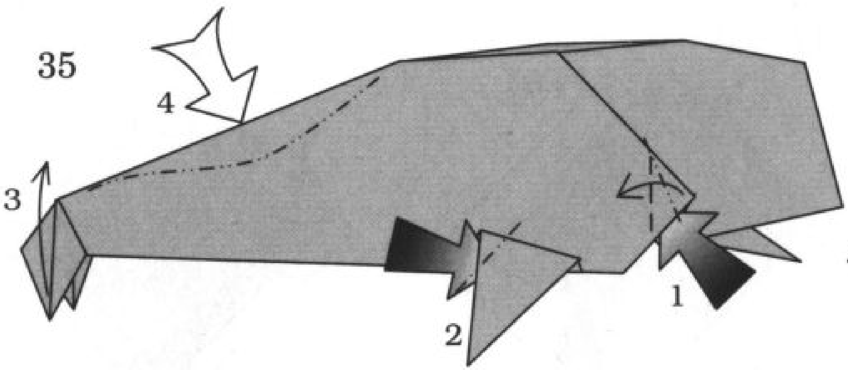
1. Sink the top inside.
2. Fold the fin up, repeat behind.

34



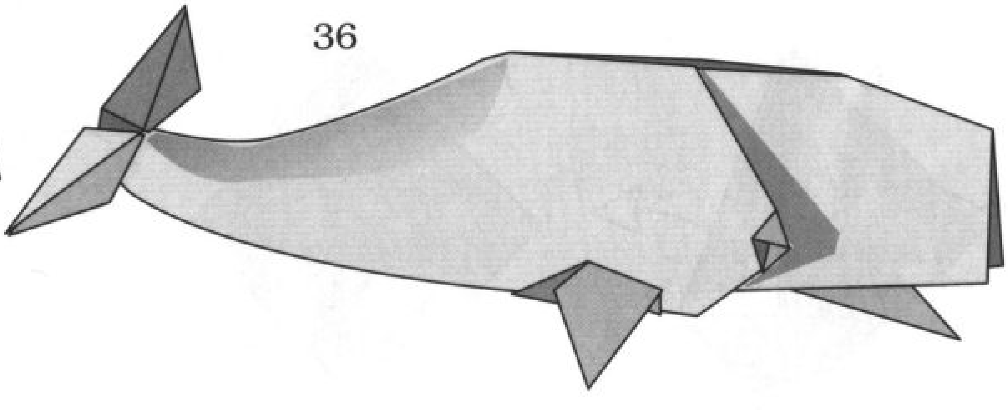
1. Squash-fold the tail.
2. Fold the fin down.
Repeat behind.

35



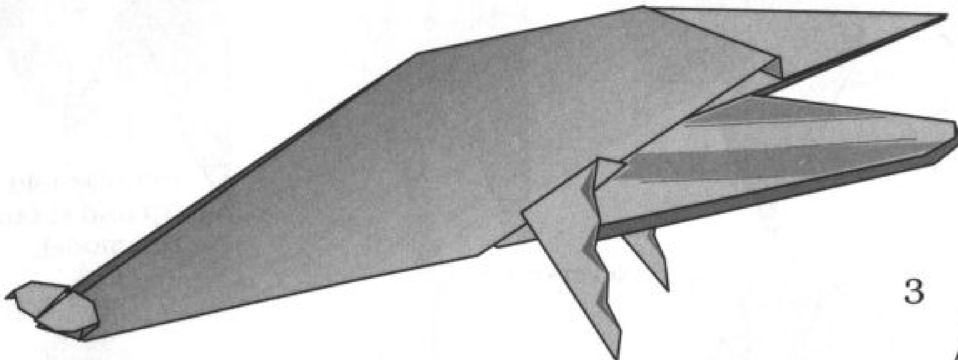
1. Squash-fold to form the eye.
2. Reverse-fold the fin.
3. Fold the tail up.
4. Shape the whale.
Repeat behind.

36



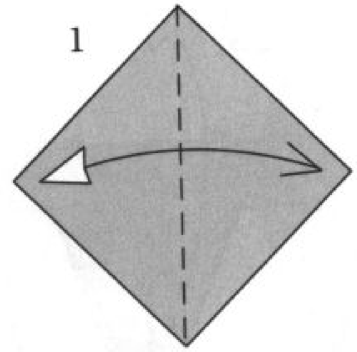
Sperm Whale

Humpback Whale



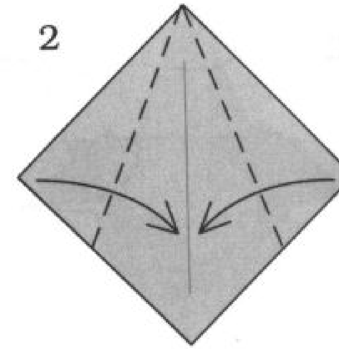
Named for the way it humps its back when it dives, the humpback whale (*Megaptera novaeangliae*) is about 50 feet long. It has large, ragged flippers with bumps along the front edge. This playful creature does somersaults while leaping out of the water. Humpbacks are famous for their long, haunting "songs," which are quite complex. These baleen whales feed on krill and small fish.

1



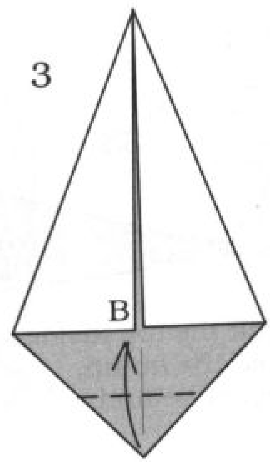
Fold and unfold.

2



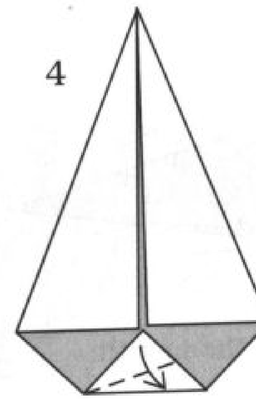
Kite-fold.

3

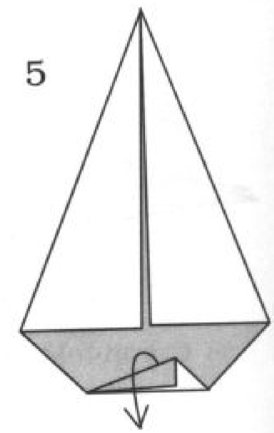


Fold A to B.

4

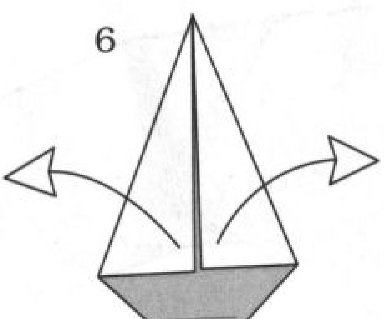


5



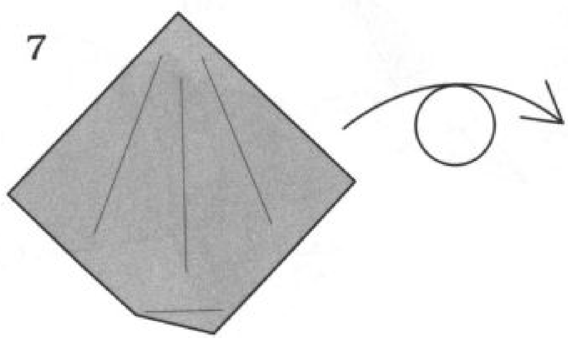
Fold down.

6

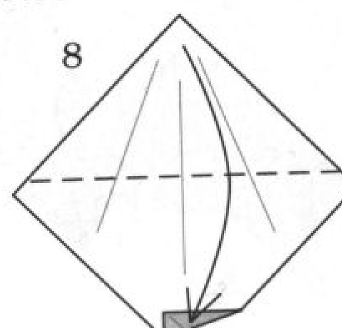


Unfold.

7

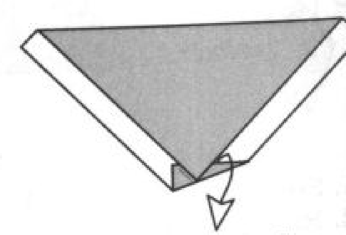


8



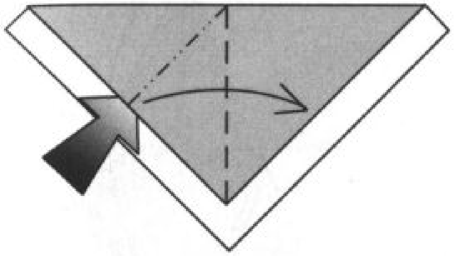
Fold the top down to point C.

9



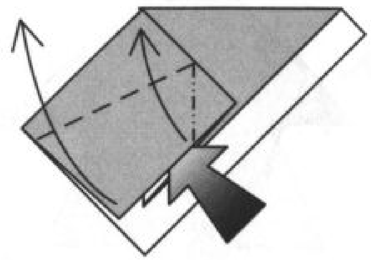
Unfold the little flap.

10



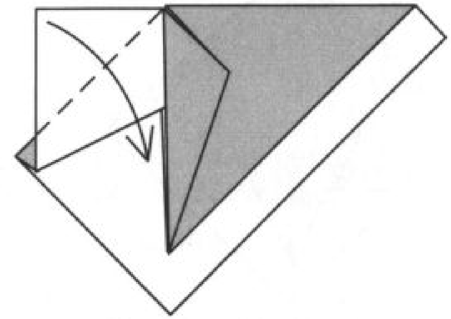
Squash-fold.

11

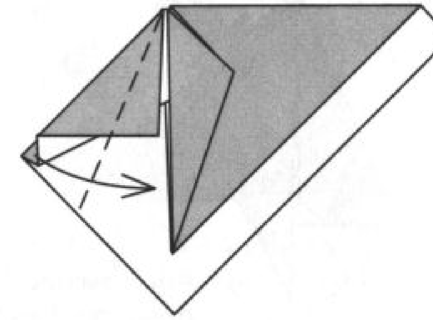


Fold on the existing crease for this squash fold.

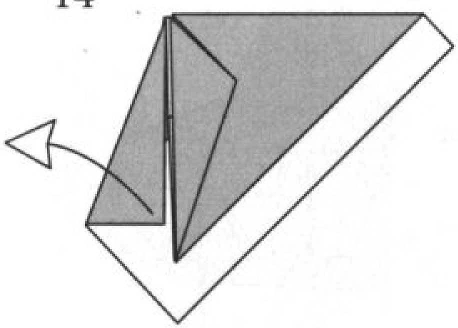
12



13

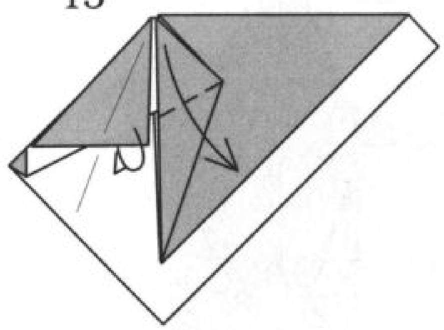


14

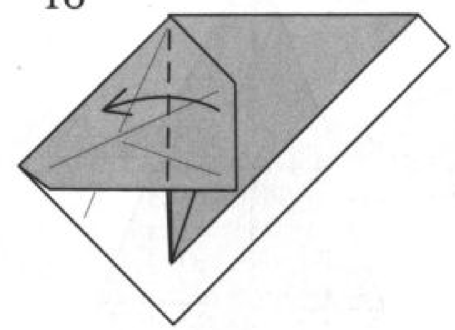


Unfold.

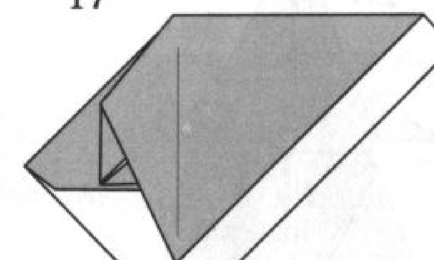
15



16

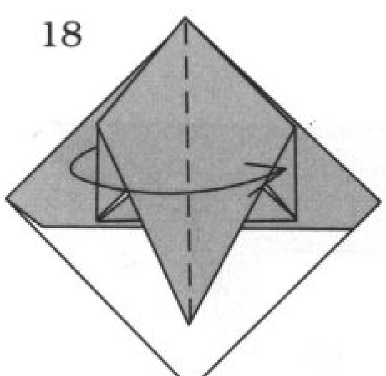


17

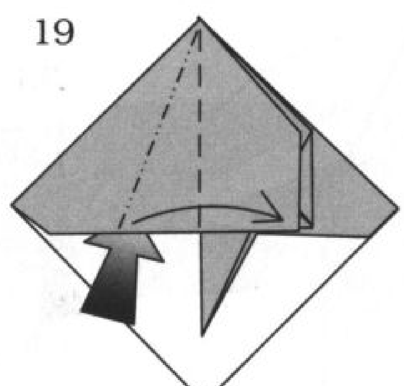


Repeat steps 10–16 on the right side.

18

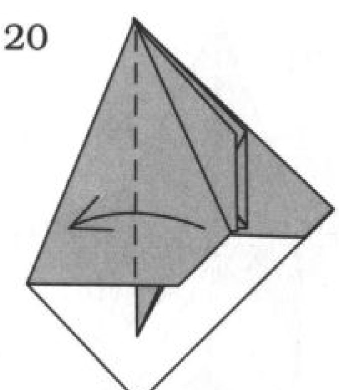


19

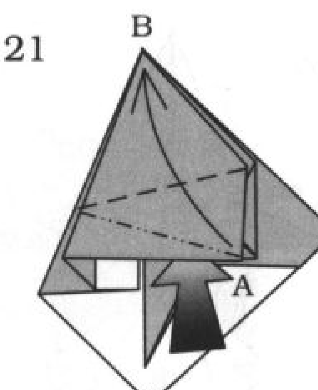


Squash-fold.

20

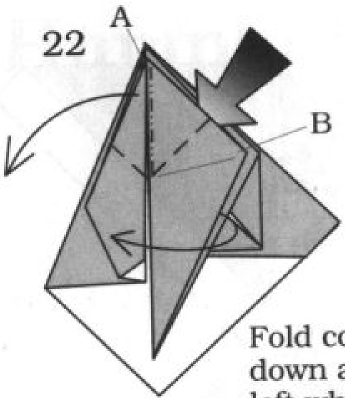


21



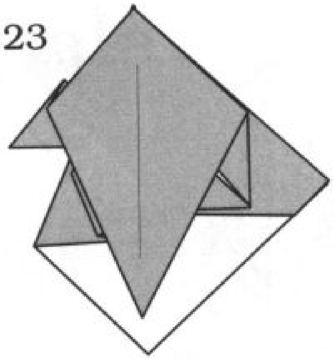
Squash-fold A to B.

22



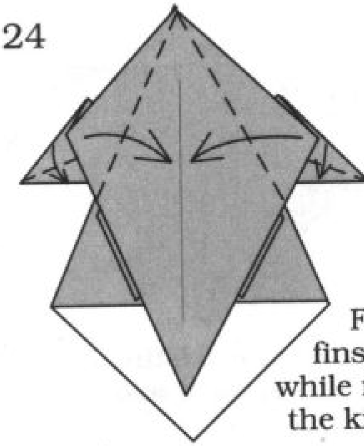
Fold corner A down and to the left while B is folded to the left.

23



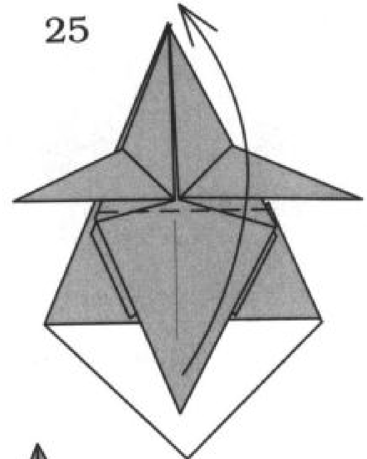
Repeat steps 18–22 on the right.

24

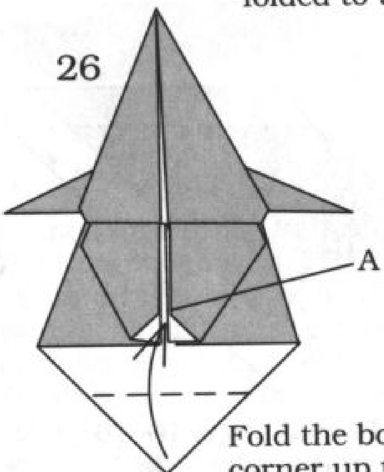


Fold the fins in half while making the kite fold.

25

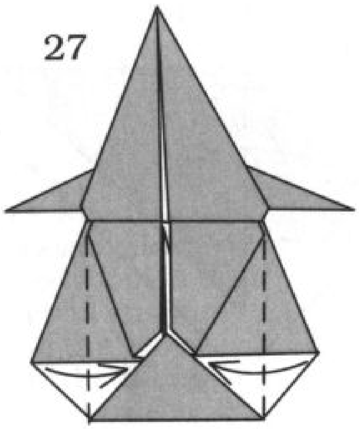


26

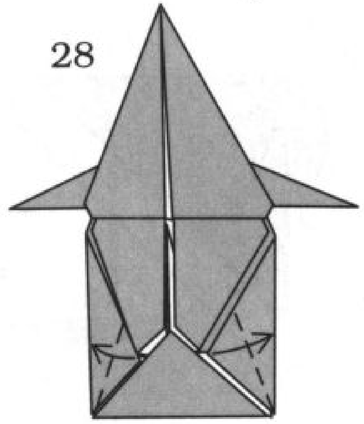


Fold the bottom corner up to point A.

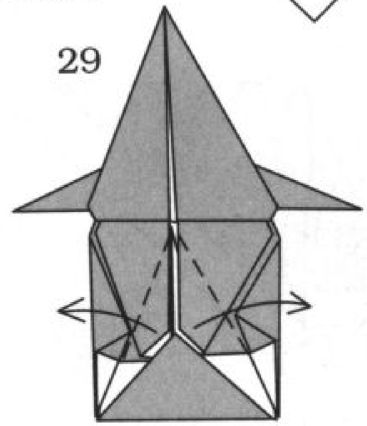
27



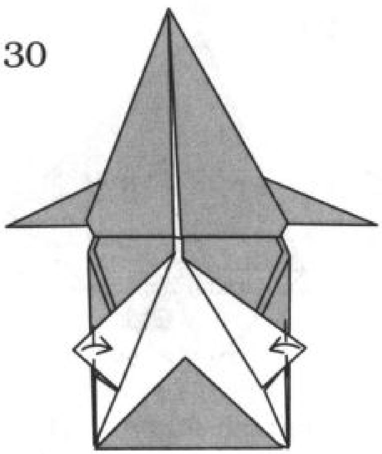
28



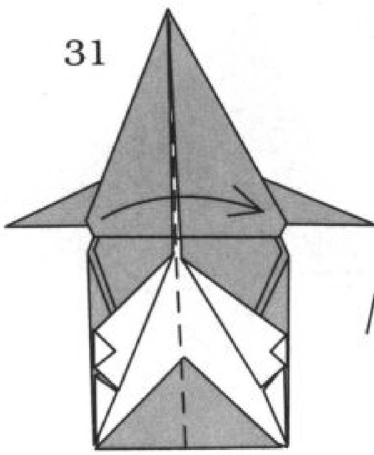
29



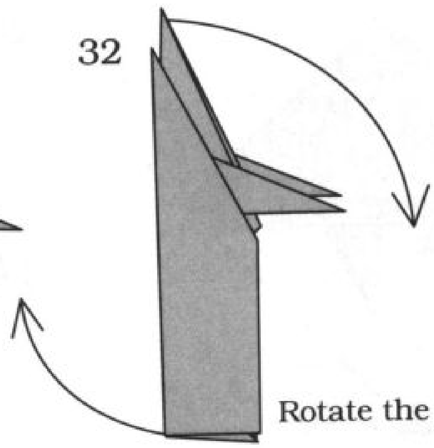
30



31

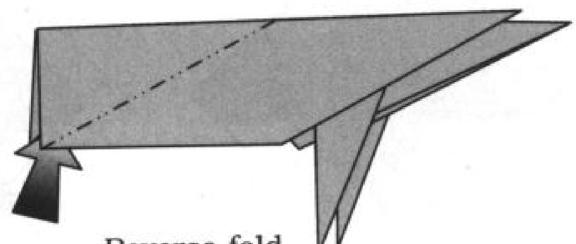


32



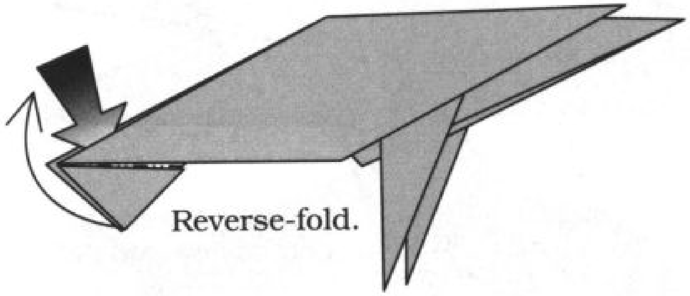
Rotate the model.

33



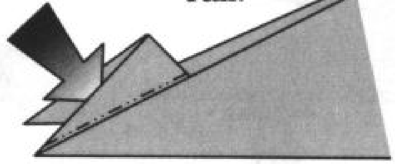
Reverse-fold.

34



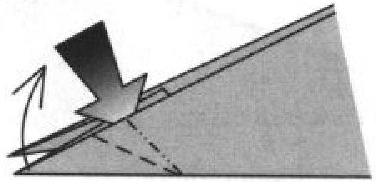
Reverse-fold.

35



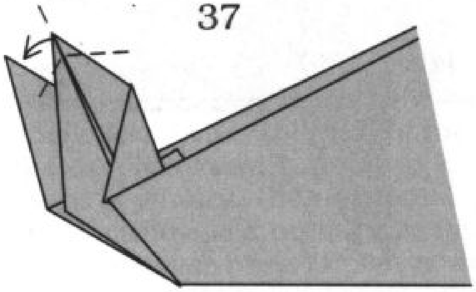
Reverse-fold.

36



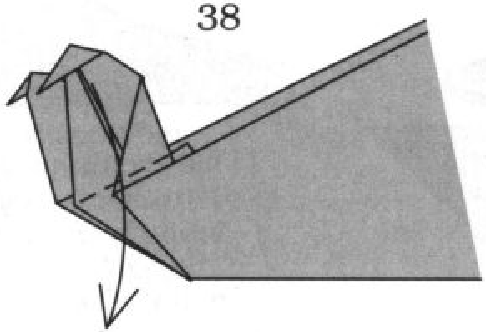
Form the tail with an asymmetric reverse fold. Repeat behind.

37



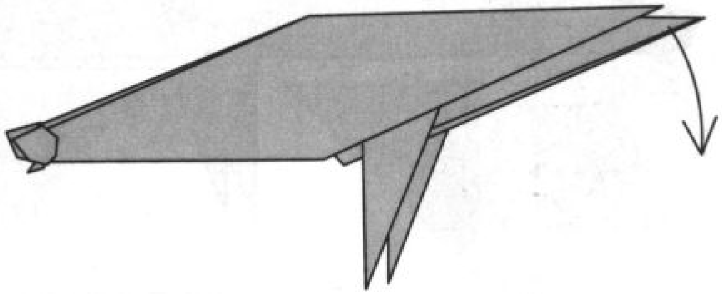
Form a tiny rabbit ear at the tip of the tail. Repeat behind.

38



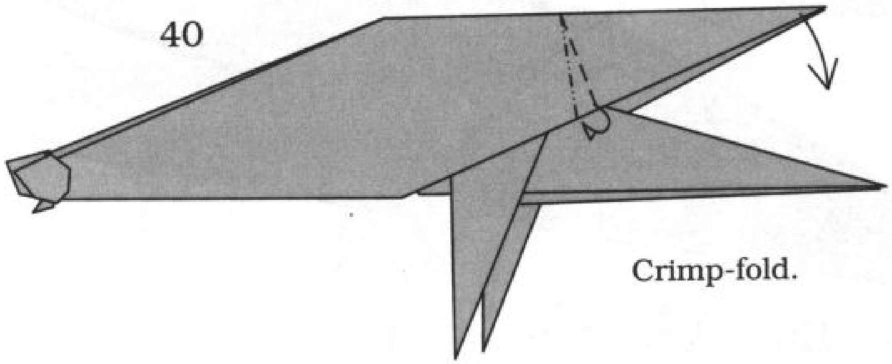
Fold down, repeat behind.

39



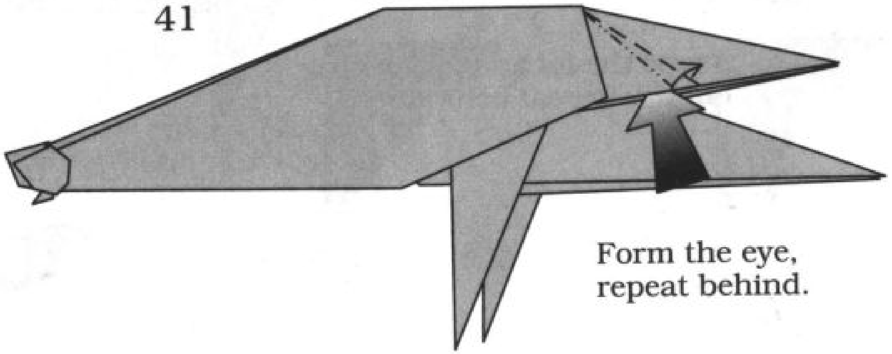
Slide the mouth down.

40



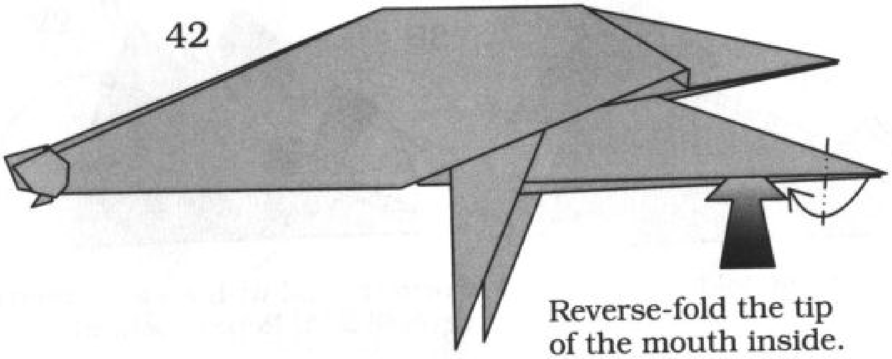
Crimp-fold.

41



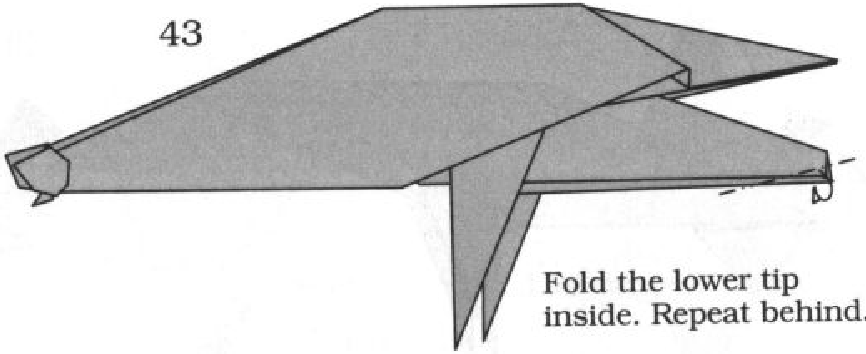
Form the eye, repeat behind.

42



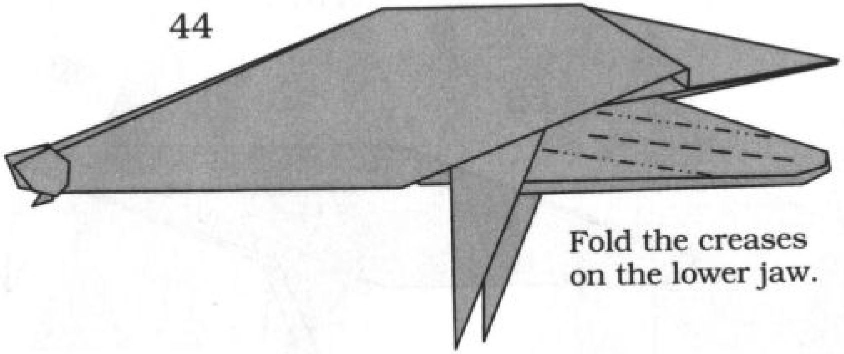
Reverse-fold the tip of the mouth inside.

43



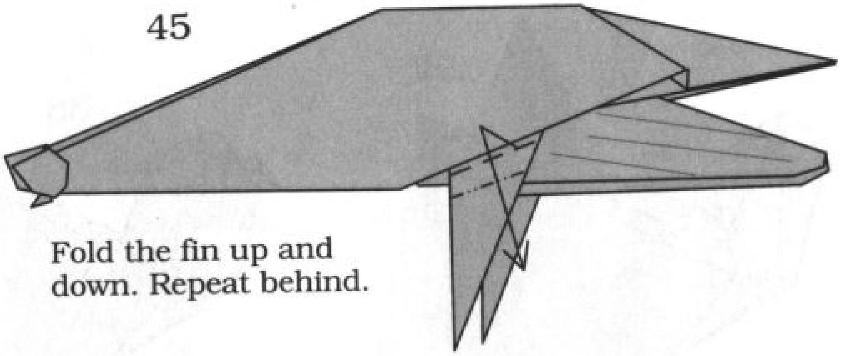
Fold the lower tip inside. Repeat behind.

44



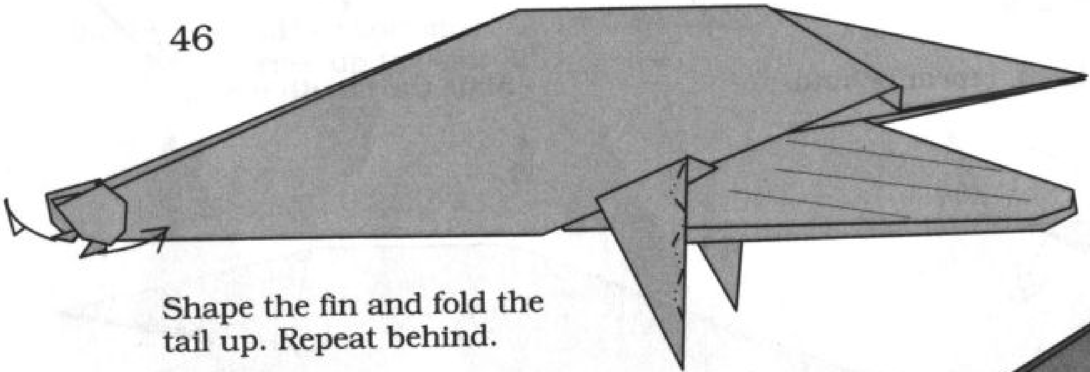
Fold the creases on the lower jaw.

45



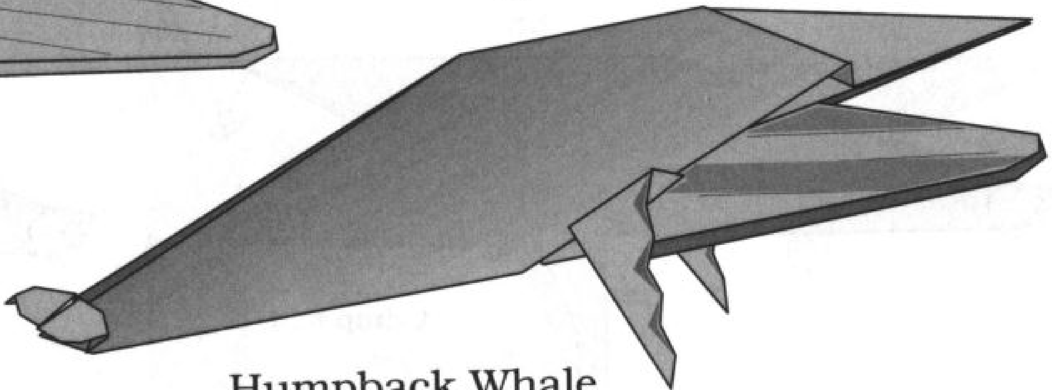
Fold the fin up and down. Repeat behind.

46



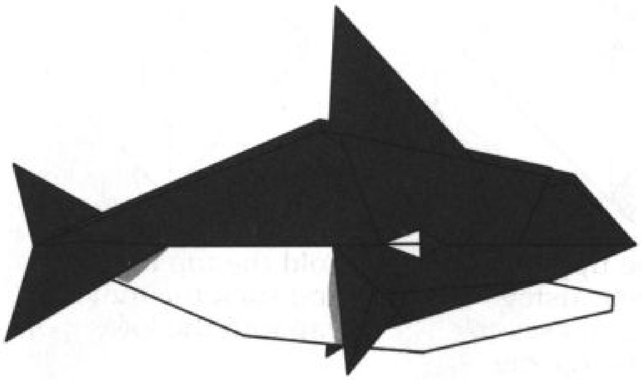
Shape the fin and fold the tail up. Repeat behind.

47



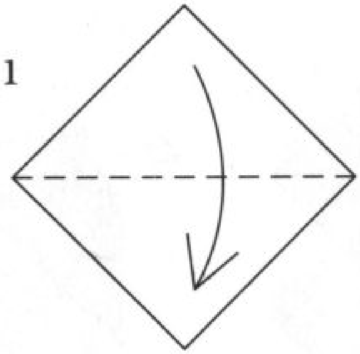
Humpback Whale

Killer Whale



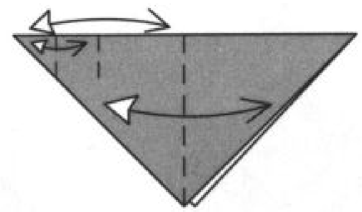
The killer whale (*Orcinis orca*) is not a whale at all, but rather a large dolphin, growing up to 30 feet long. Widely known as "the wolf of the seas," these whales roam in packs and have been known to attack the largest of whales, the blue whale; more commonly, however, they feed on fish, penguins, seals and squid, and have never been known to attack man. They are exceedingly intelligent creatures and are easily trained, and entertain at marine parks worldwide.

1



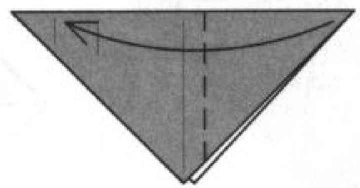
Fold the square in half along the diagonal.

2



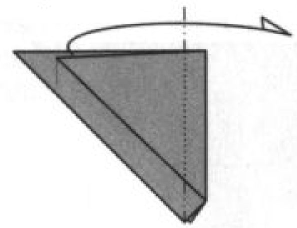
Fold and unfold three times.

3



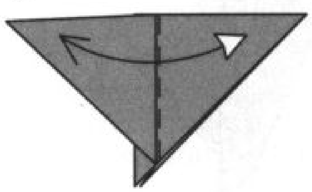
Fold the right corner over to touch the last crease you made.

4



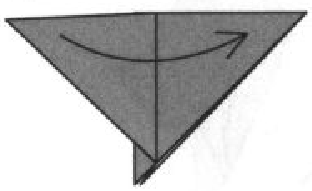
Fold the left corner behind on an existing crease.

5



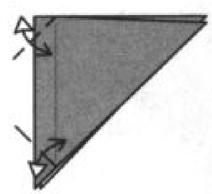
Fold and unfold.

6



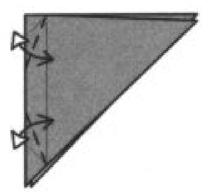
Fold the left corner over to the right.

7



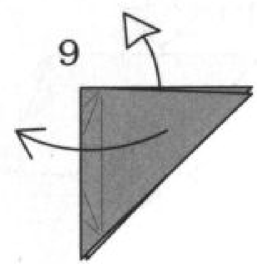
Fold and unfold.

8



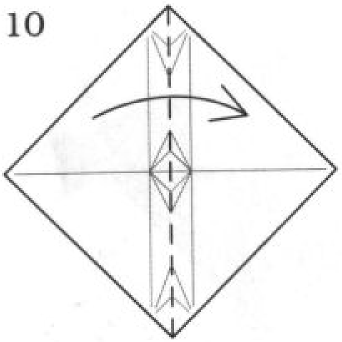
Fold and unfold.

9



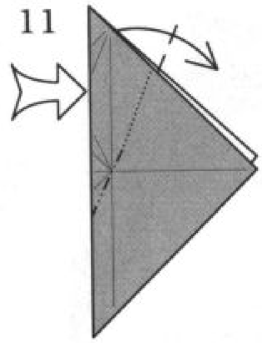
Unfold the paper completely.

10



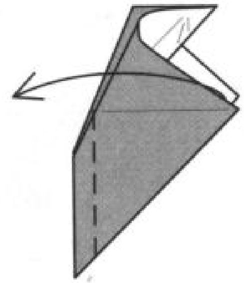
Fold the paper in half.

11



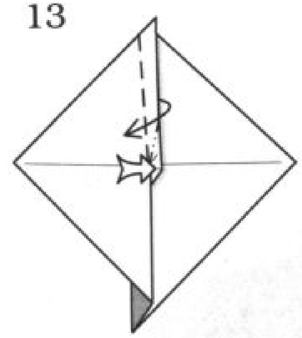
Reverse-fold, using existing creases. Don't make the crease sharp all the way.

12



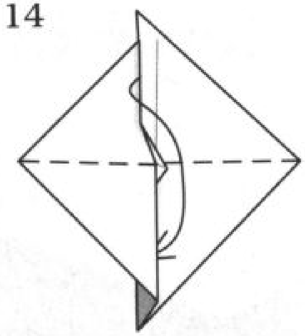
Fold one layer to the left on an existing crease.

13



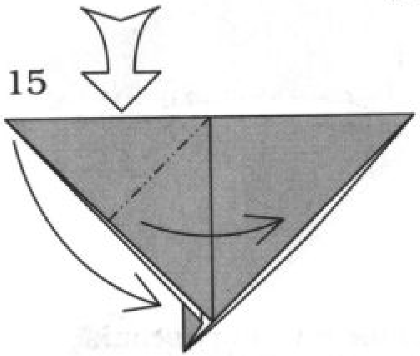
Fold the upper crease to the left, using existing creases to make the zig-zag.

14



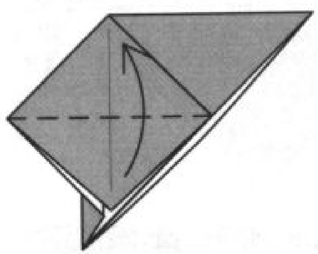
Fold the top half down and tuck the indicated flap into the lower pocket.

15



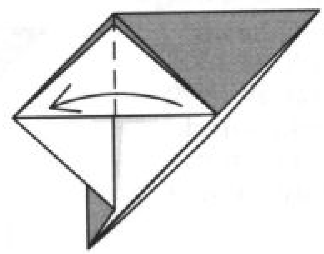
Squash-fold the left flap.

16



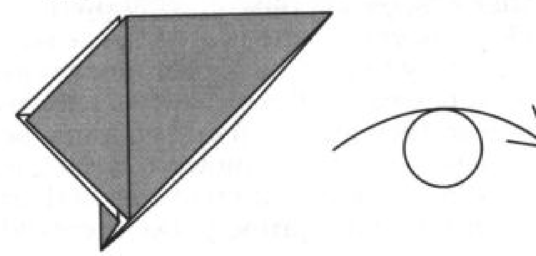
Fold the bottom point up.

17



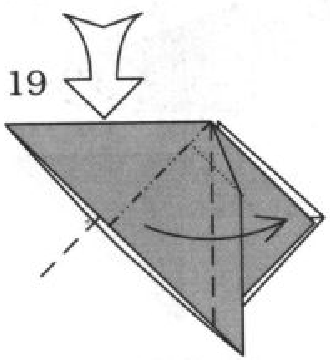
Close up.

18



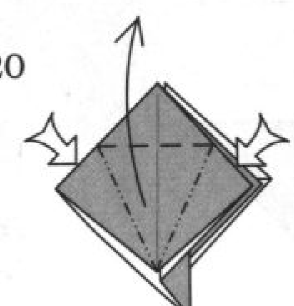
Like this. Turn the paper over.

19



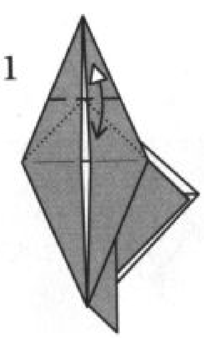
Squash-fold. The dash line shows hidden thickness.

20



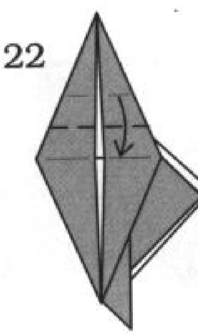
Petal-fold.

21



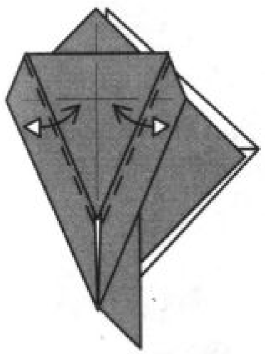
Fold and unfold.

22



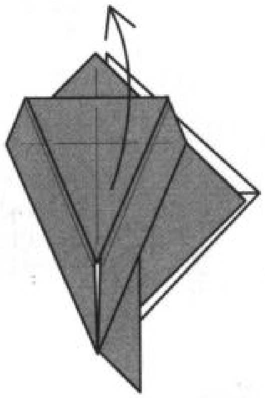
Fold the last crease down to touch the horizontal creases.

23



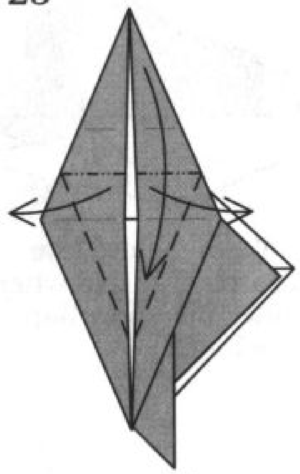
Fold and unfold.

24



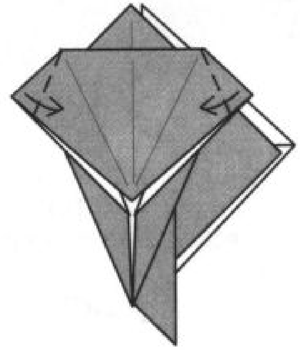
Unfold.

25



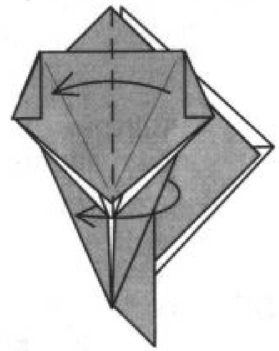
Open out the sides and fold the top down, all on existing creases.

26



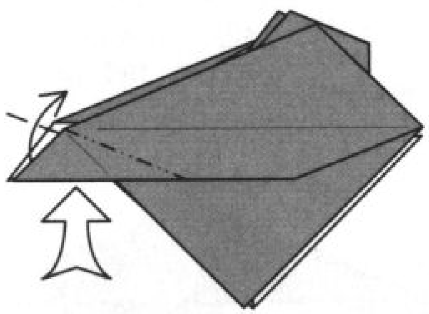
Fold the corners in so that the creases line up with the edges underneath.

27



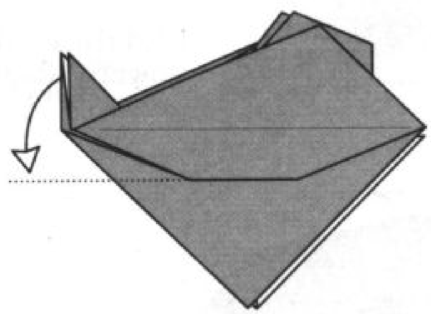
Close the model up.

28



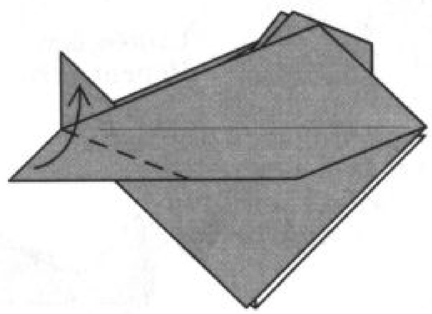
Reverse-fold both corners together as one on existing creases.

29



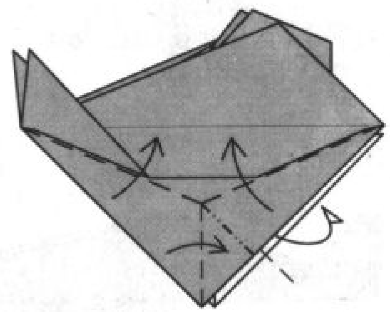
Pull out the inner layer of paper.

30



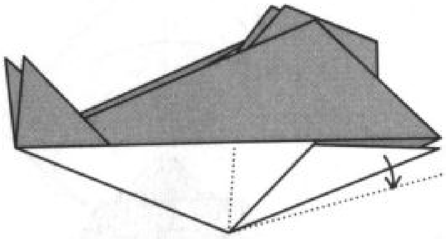
Fold the flap upward to line up with the other flap.

31



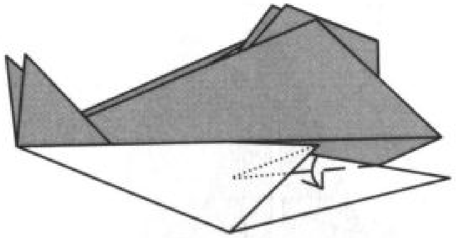
Fold a rabbit ear; repeat behind.

32



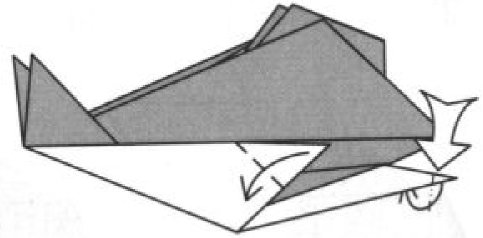
Pull the white point down slightly.

33



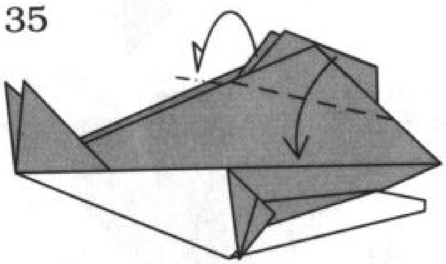
Valley-fold the white layer, forming a reverse fold where it goes under the short flap. Repeat behind.

34



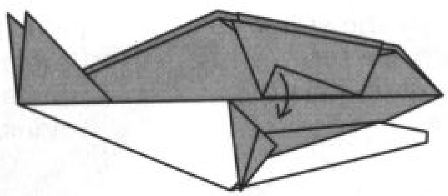
Fold the short flap down; repeat behind. Reverse-fold the tip of the white point.

35



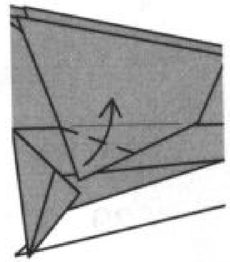
Fold the top flap down; repeat behind.

36



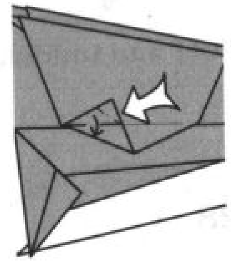
Unfold the corner. Repeat behind.

37



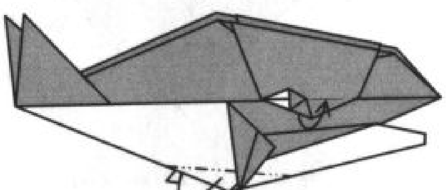
Fold the corner upward. Repeat behind.

38



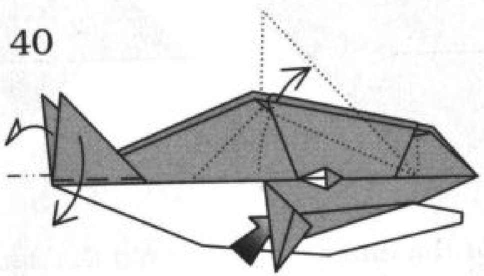
Squash-fold. Repeat behind.

39



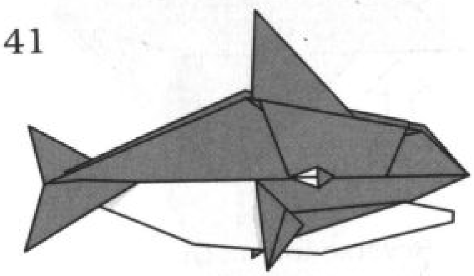
Mountain-fold the belly. Tuck the corner below the white spot under the lower layers, but leave the white spot showing. Repeat behind.

40



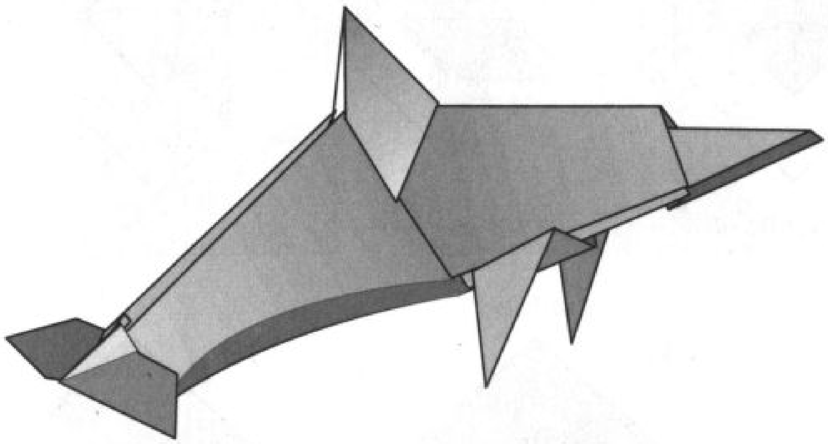
Fold the tail fins down. Open out the pectoral fins. Reverse-fold the dorsal fin up and out from the top of the body.

41



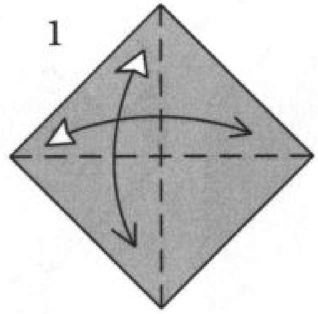
Killer Whale

Dolphin



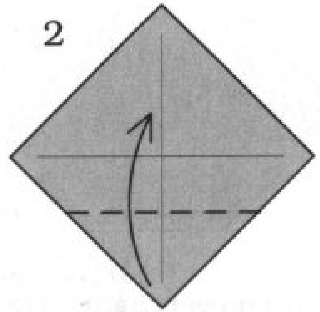
About 8 to 12 feet long, dolphins (family *Delphinidae*) are small, toothed whales. They are very playful and are often found near ships. They are known for their intelligence—dolphins can be taught many tricks—and for their ability to detect small objects with their sonar system. These noisy creatures can communicate by clicking and whistling through their blowholes.

1



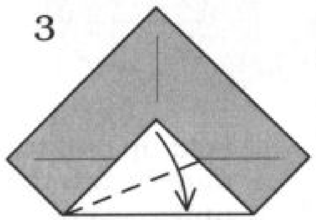
Fold and unfold along the diagonals.

2

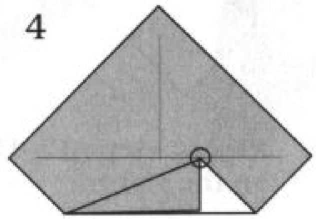


Crease lightly. There are no guides for this fold; in step 4 you will find out if it was correct.

3

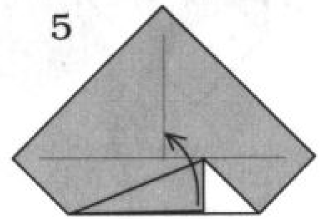


4



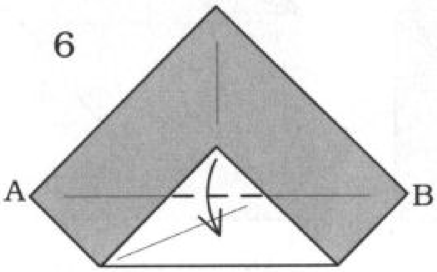
If the lines intersect where the circle is drawn then continue. Otherwise, go back to step 2 with a better guess.

5



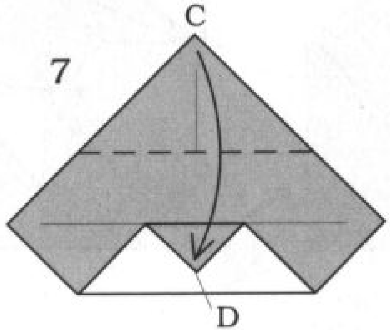
Unfold.

6



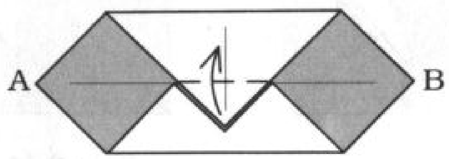
Fold down along line A–B.

7



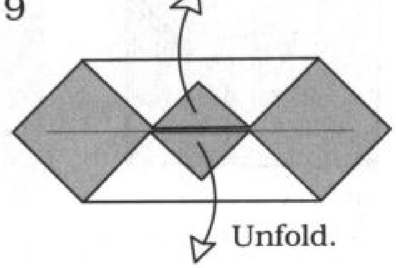
Fold C to D.

8



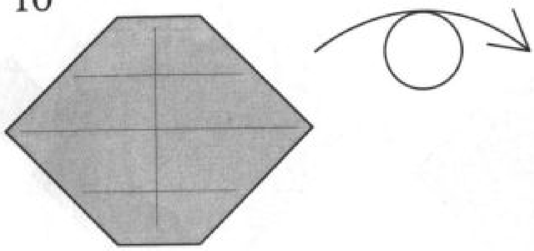
Fold up along line A–B.

9



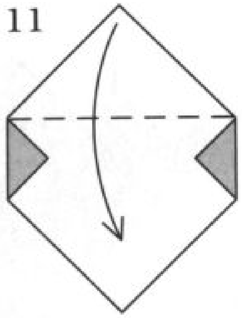
Unfold.

10

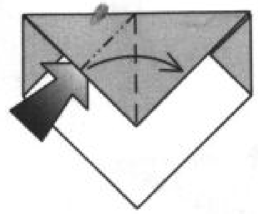


Turn over and rotate.

11

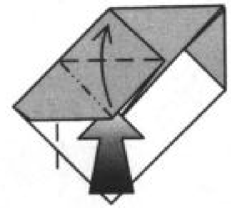


12



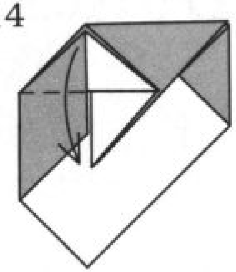
Squash-fold.

13

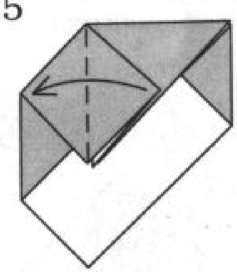


Squash-fold.

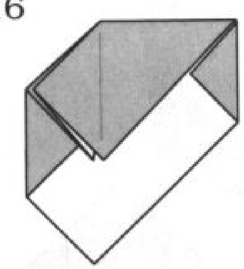
14



15

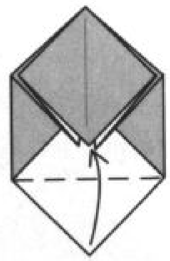


16



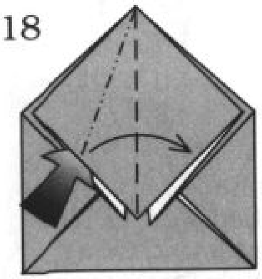
Repeat steps 12–15 on the right.

17



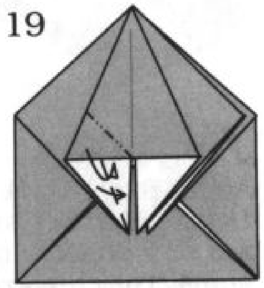
Fold up and tuck underneath the upper layers.

18

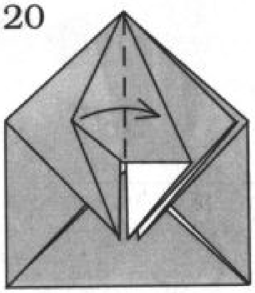


Squash-fold.

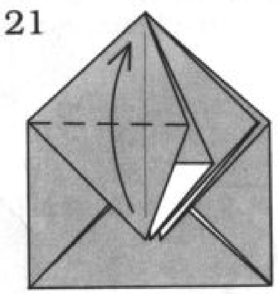
19



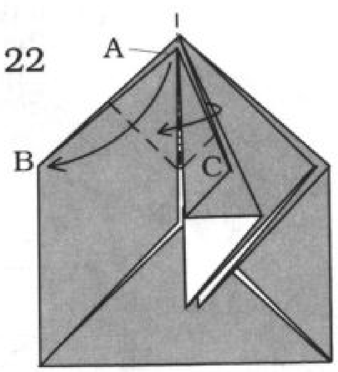
20



21

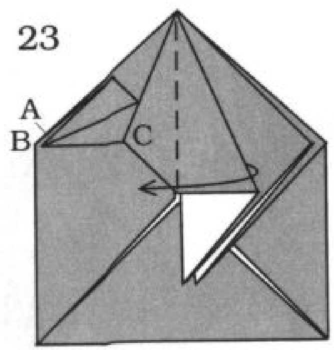


22

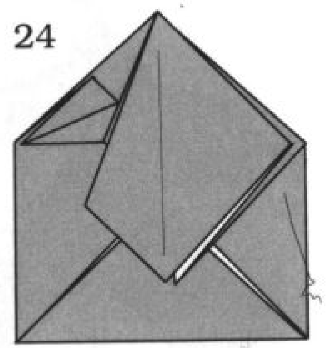


Fold A to B while folding C to the left.

23

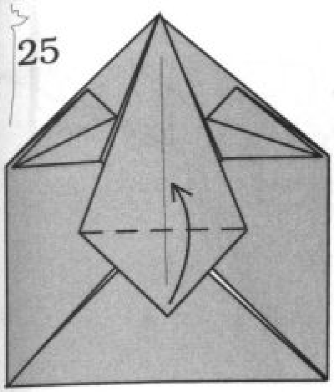


24

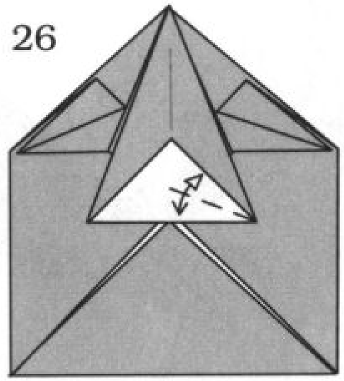


Repeat steps 18–23 on the right.

25

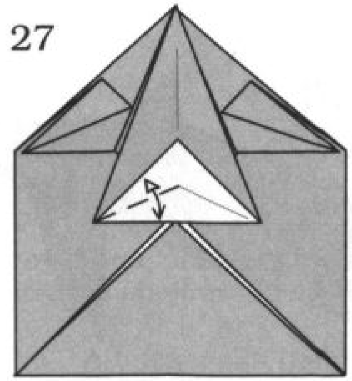


26



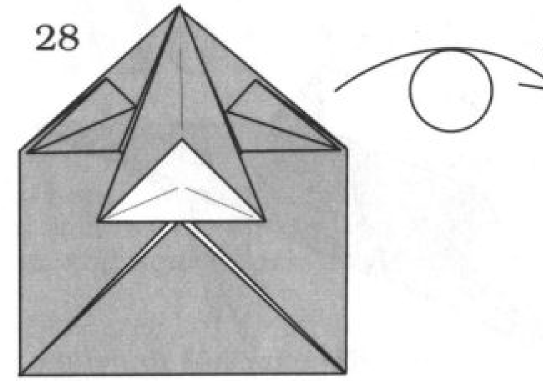
Fold and unfold.

27

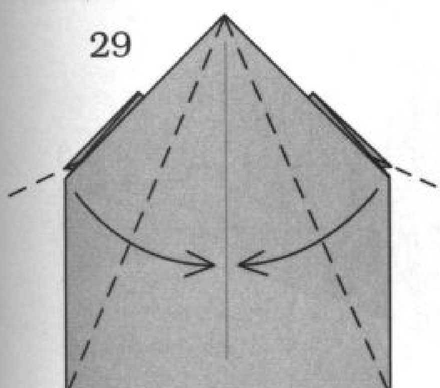


Fold and unfold.

28

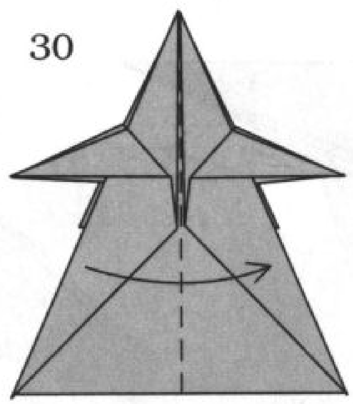


29



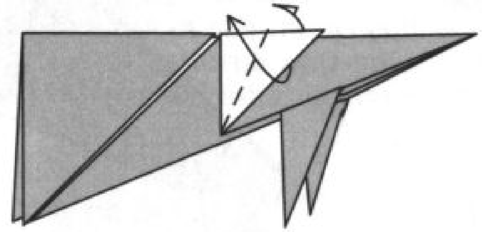
Fold the fins in half while making the kite fold.

30



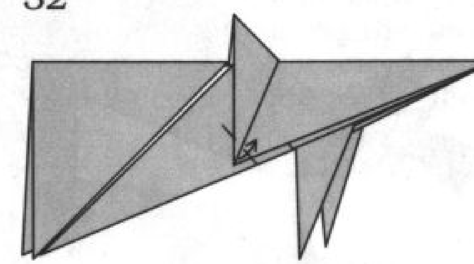
Fold in half and rotate.

31



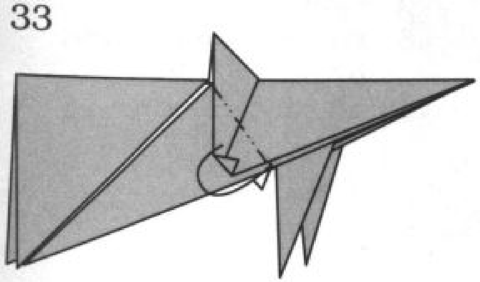
Outside-reverse-fold along the existing creases.

32



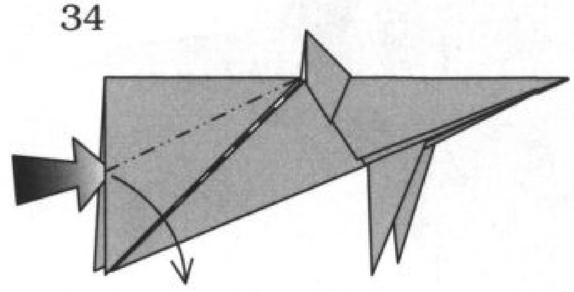
Make a small fold, repeat behind.

33



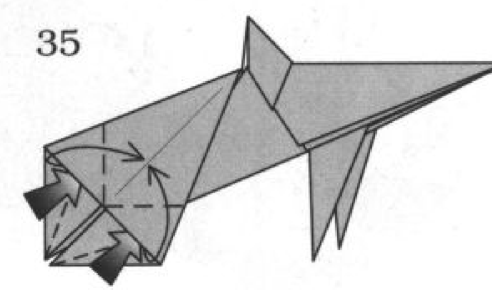
Tuck underneath, repeat behind.

34



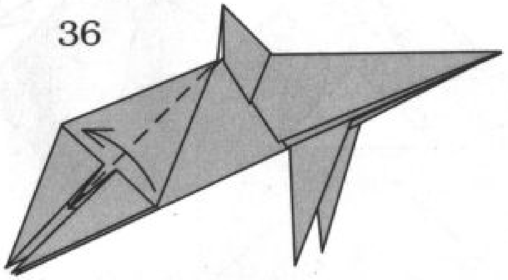
Squash-fold.

35

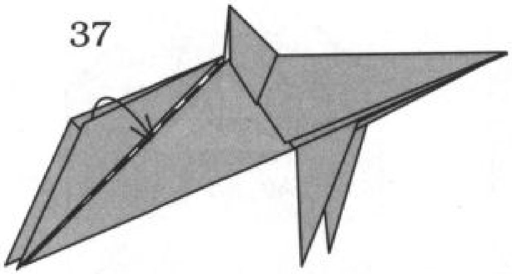


Squash-folds.

36

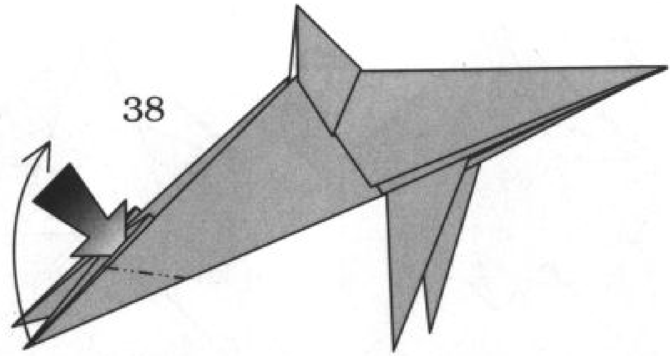


37



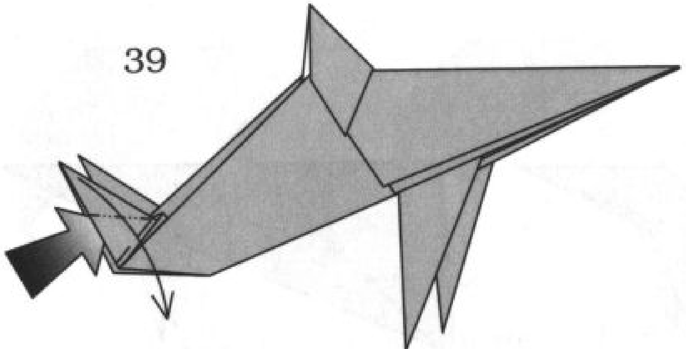
Tuck inside, repeat behind.

38



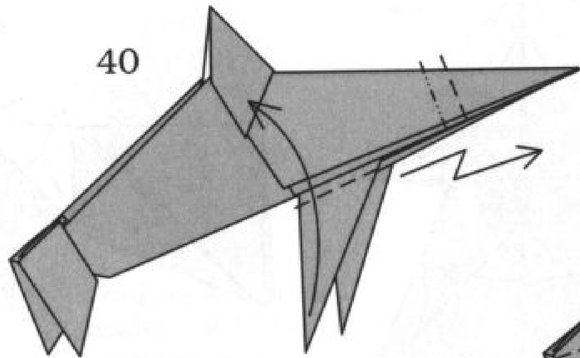
Reverse-fold, repeat behind.

39



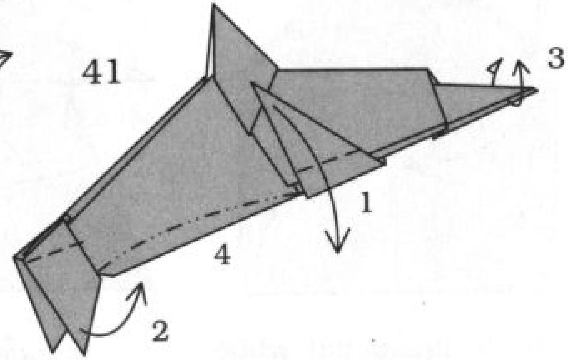
Squash-fold,
repeat behind.

40



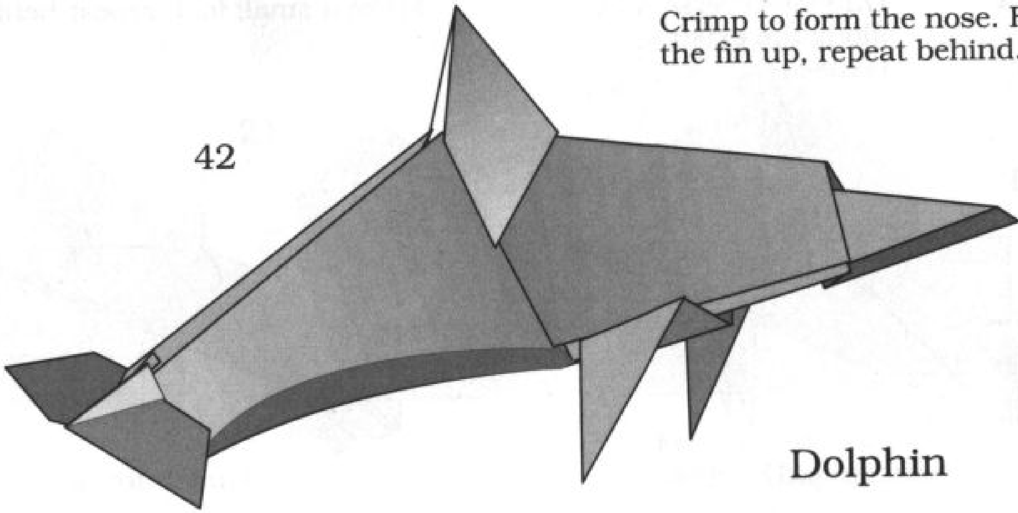
Crimp to form the nose. Fold the fin up, repeat behind.

41



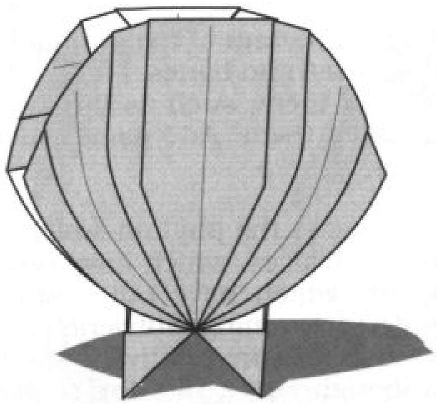
Repeat behind the following:
1. Fold the fins down.
2. Fold the tail up.
3. Pull out a little paper by the mouth.
4. Shape the body.

42



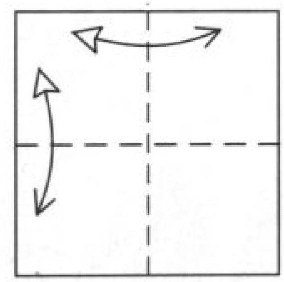
Dolphin

Giant Clam



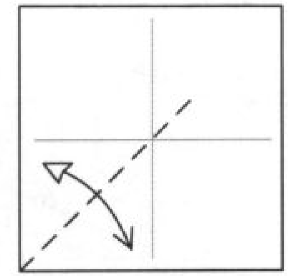
The Giant Clam (*Tridacna derasa*) produces the largest shell of any mollusk, ranging up to six feet across and weighing five hundred pounds. It anchors itself to the sea floor with its gape directed upward and its mantle protruding for maximum exposure to light. It derives its nutrition from symbiotic algae in the mantle tissue, and while it is famous from underwater B-movies in which an unwary diver, stepping into the open maw, becomes trapped and expires, the clam closes at the slightest disturbance in its vicinity, making such a scenario unlikely.

1



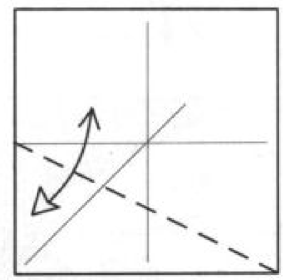
Crease the paper in half vertically and horizontally.

2



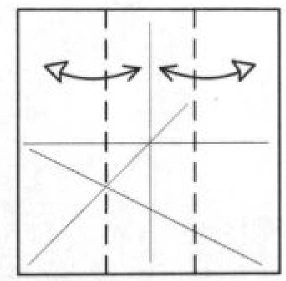
Crease the bottom left corner in half.

3



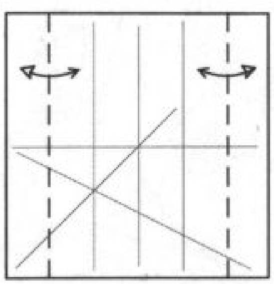
Crease connecting the two points shown.

4

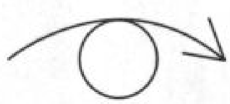


The crease from step 3 crosses the diagonal 1/3 of the way from left to right. Use this mark to divide the paper into thirds.

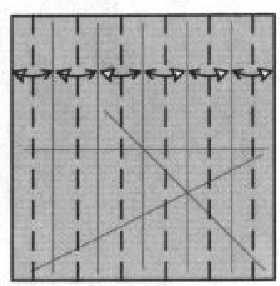
5



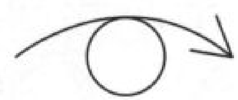
Fold the edges to the creases just made and unfold. Turn the paper over.



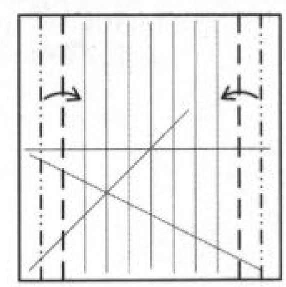
6



Divide the paper into 12ths with valley folds and turn the paper over.

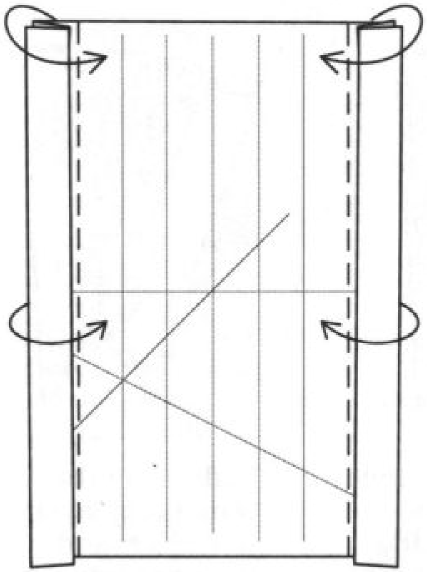


7



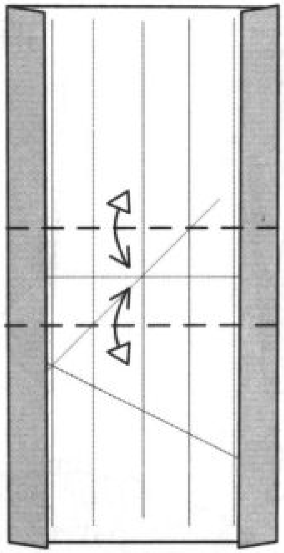
Pleat the sides.

8



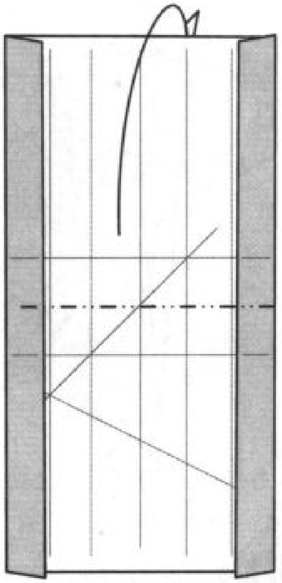
Fold all three layers together as one, on each side.

9



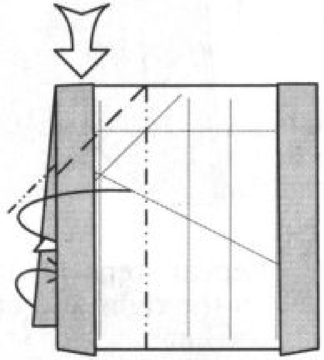
Crease through the intersections of the diagonal and vertical creases.

10



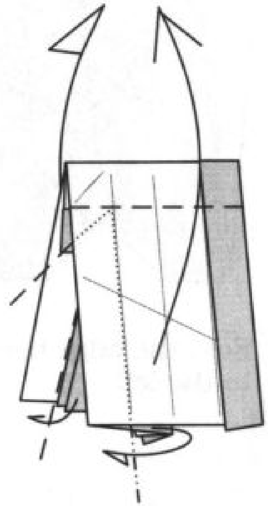
Mountain-fold the paper in half.

11



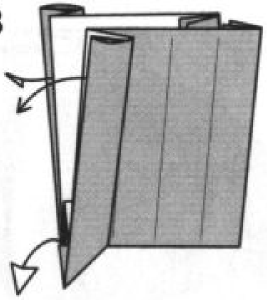
Crimp downward.

12



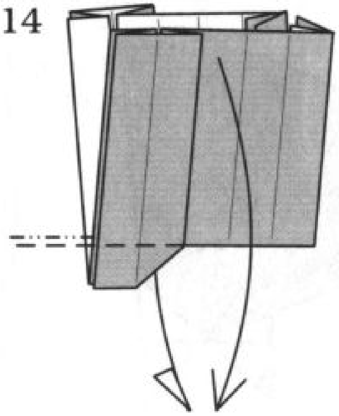
Swing the front and rear flaps upward.

13



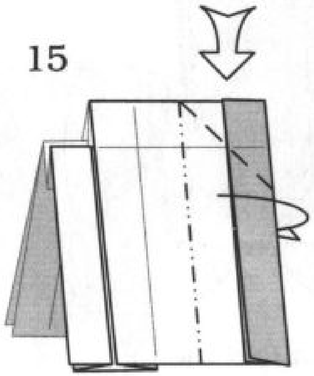
Pull out all of the hidden layers of paper.

14



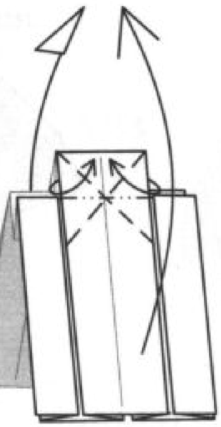
Fold the front and rear flaps back downward.

15



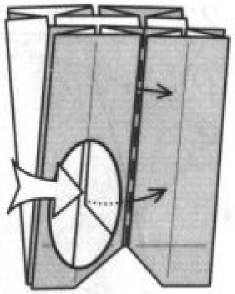
Repeat steps 11-14 on the right.

16



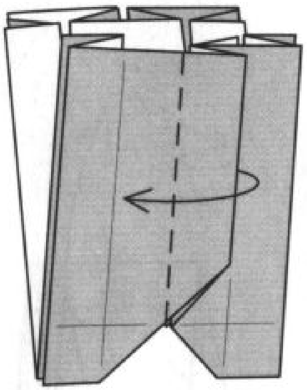
Fold the front and rear flaps back upward, incorporating the creases shown at the top.

17



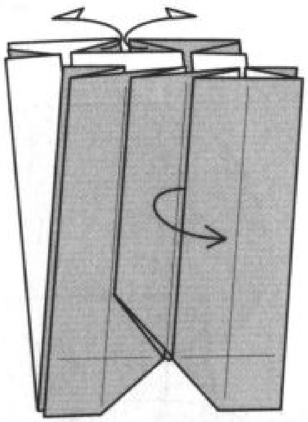
Closed-sink the edge shown to the right.

18



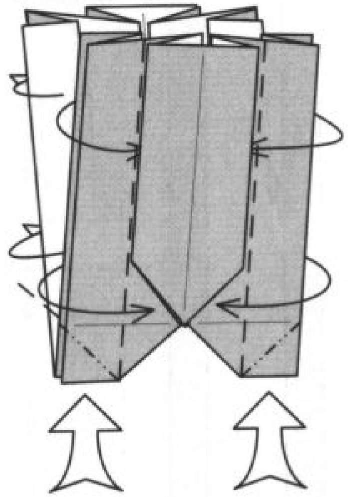
Fold the edge back to the left.

19



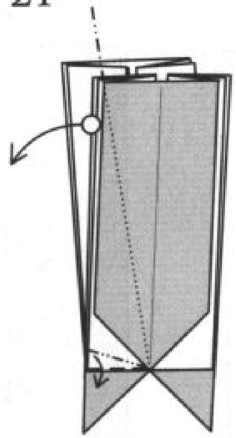
Repeat steps 17–18 on the right and on the back.

20



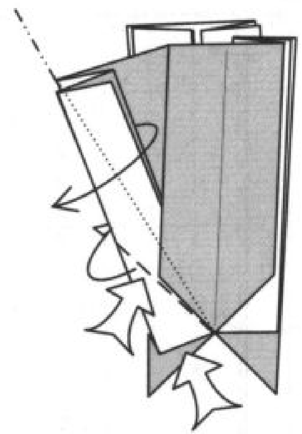
Squash-fold the bottom corners and tuck the layers symmetrically behind the middle edges.

21



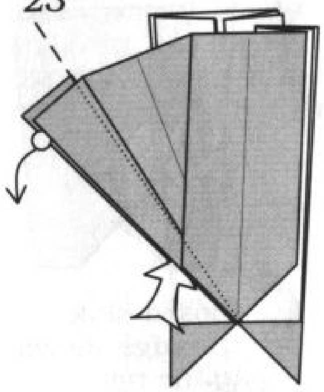
Crimp the bottom and swivel the layers of the top flap to the left as far as possible.

22



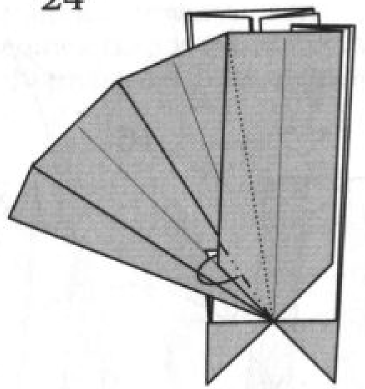
Valley-fold the remaining layers to the left and tuck the crimp underneath.

23



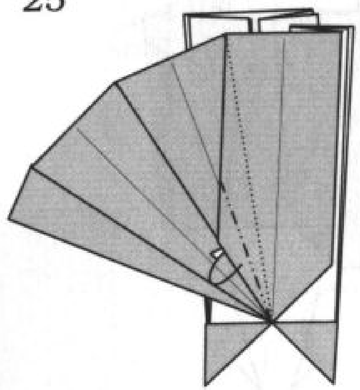
Stretch two more layers to the left.

24



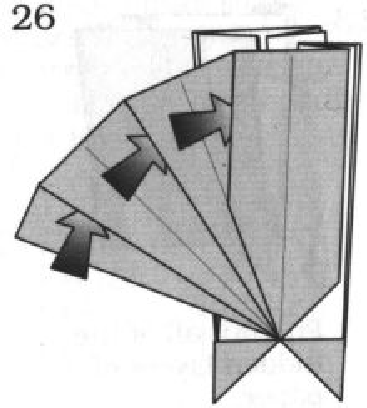
Mountain-fold the corner behind.

25



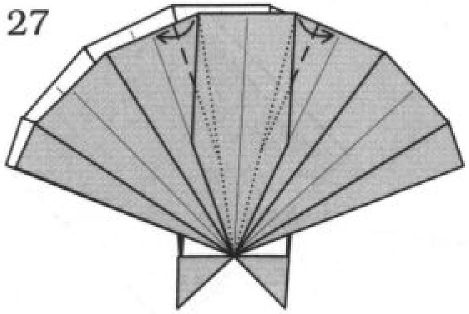
And again.

26



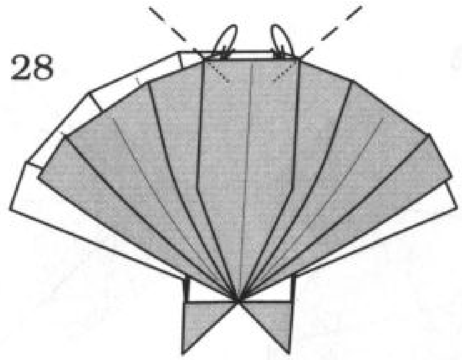
This is the direction all the pockets should be facing. Repeat steps 21–25 on the right side and behind.

27



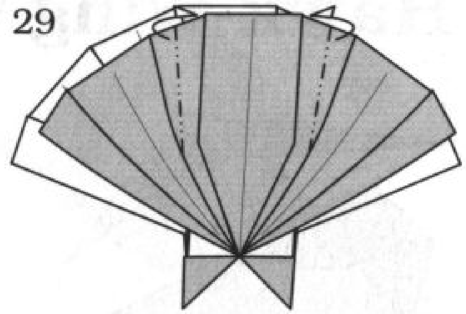
Pleat the sides in as shown; the middle of the paper will hump upward and the model will no longer lie flat.

28



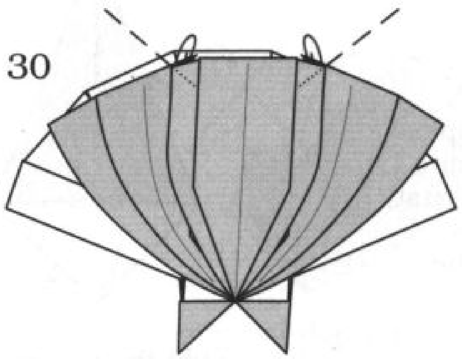
Valley-fold the pleats to lock them together.

29



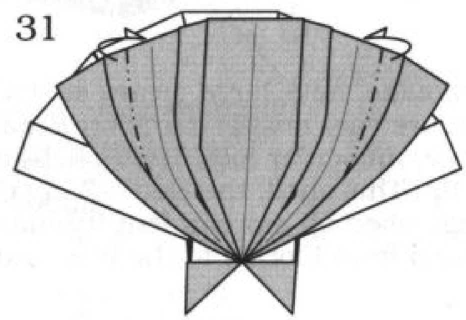
Pleat again. The middle will curve upward more and more with each set of pleats.

30



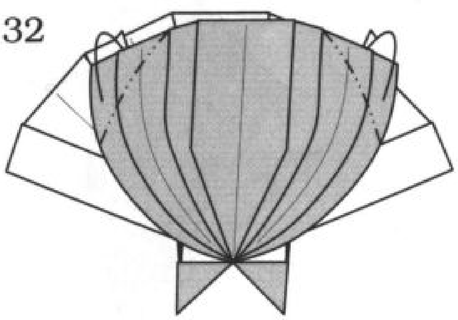
Valley-fold these pleats to lock them.

31



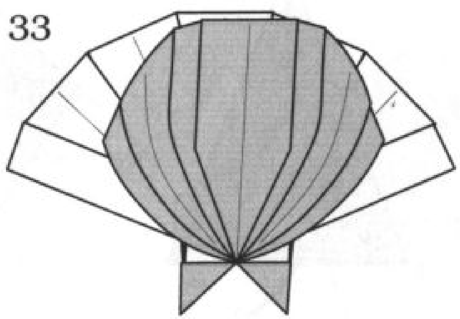
Pleat again.

32



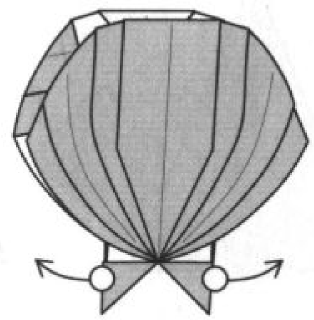
Valley-fold the corners underneath.

33



Repeat steps 27–32 on the other side of the model.

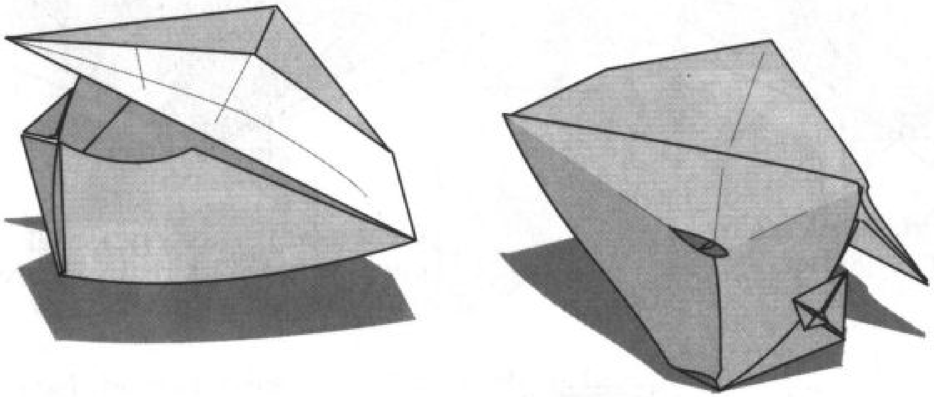
34



Giant Clam

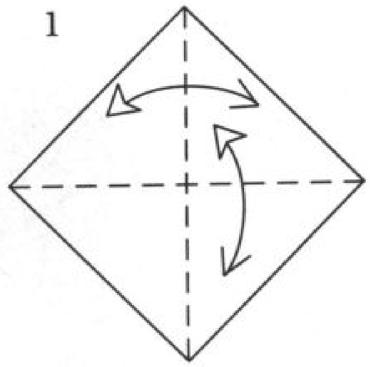
Pull the two tabs away from each other and the shell will open and close.

Hawk-Wing Conch



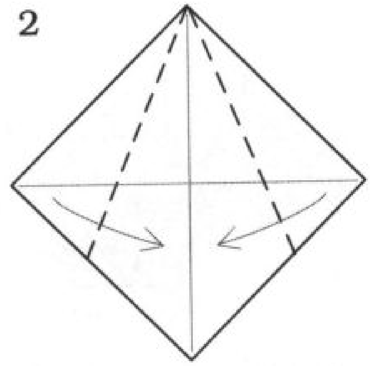
True conchs, family *Strombidae*, have large, heavy shells and inhabit tropical waters worldwide. Conchs are very mobile carnivores that move by pushing themselves along on a large, muscular foot. Their shells are large and robust, with a highly sculptured lip. This shell, the Hawk-Wing Conch (*Strombus raninus*), is further distinguished by a prominent tubular projection at the top of the mantle. It is found from Florida to the West Indies and Brazil.

1



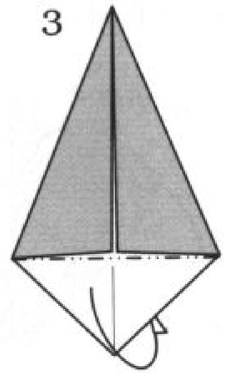
Crease the diagonals.

2



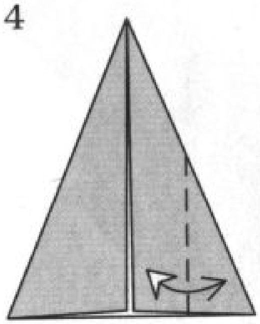
Fold the edges in to the center.

3



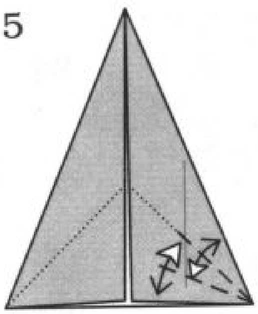
Fold the bottom corner up behind.

4



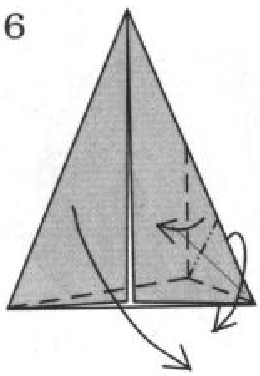
Fold the right corner in to the middle and back out again.

5



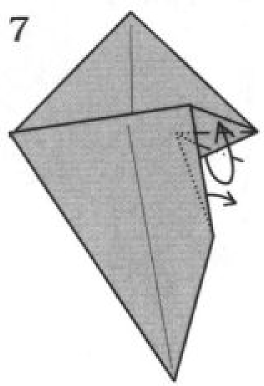
Crease the right corner into thirds. The upper crease lies on top of the hidden edge.

6



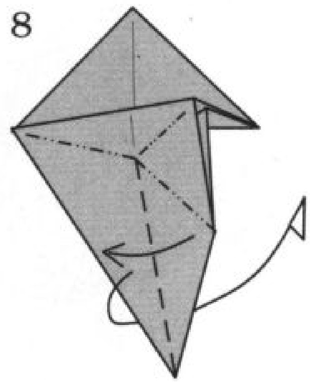
Fold a rabbit ear.

7



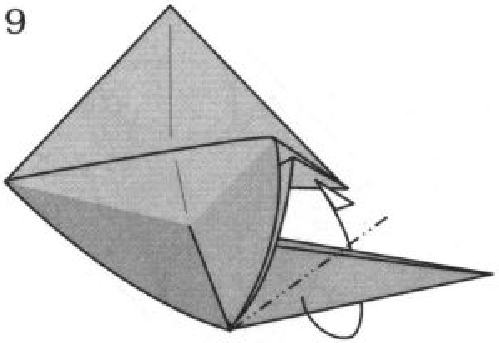
Swivel-fold.

8



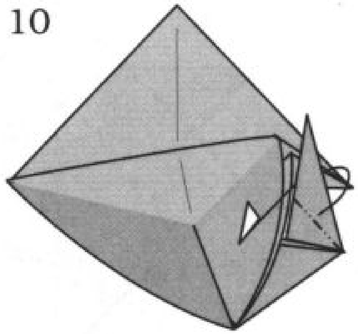
Pinch the flap in half and swing it over to the right. The model becomes three-dimensional.

9



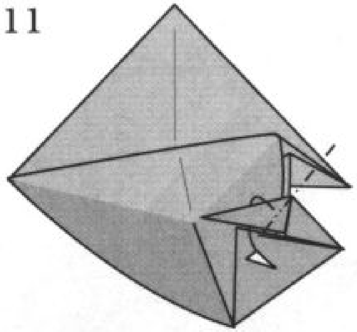
Loosely twist the point behind and upwards.

10



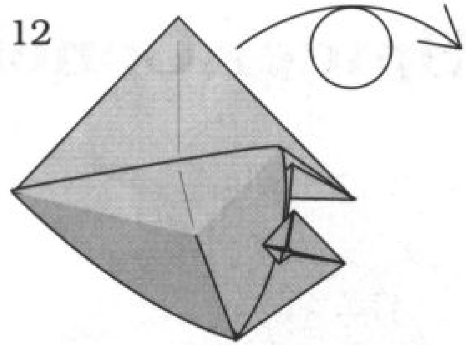
Twist it behind and to the left.

11



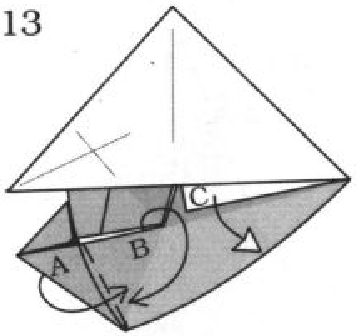
Continue until you run out of point.

12



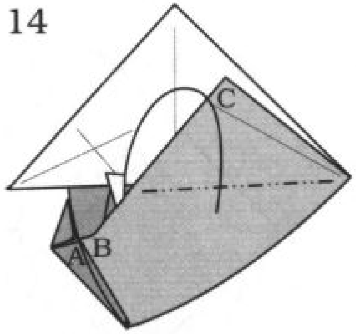
Like this. Turn the model over.

13



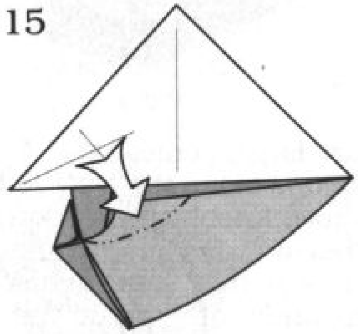
Pull the loose corner C entirely out of the model and bring points A and B together.

14



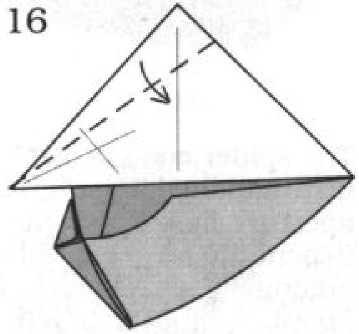
Gently roll flap C into the interior of the model. Do not make a sharp crease.

15



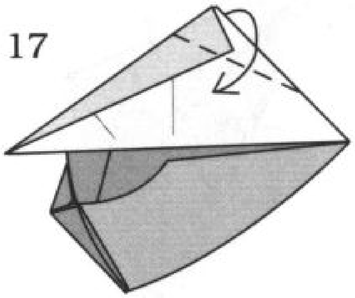
Push in here; make the crease curved.

16



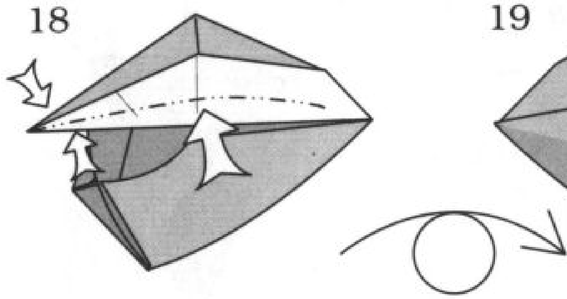
Fold 1/4 of the angle down.

17



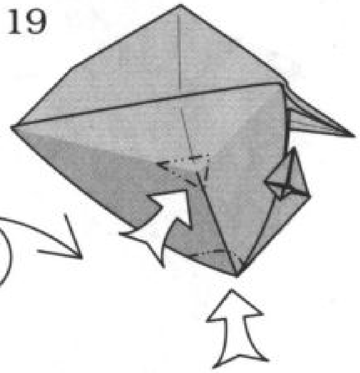
Fold down.

18



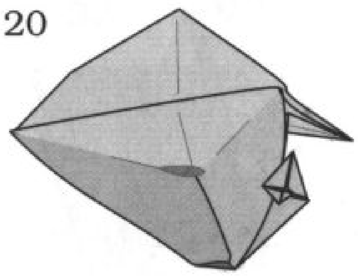
Pinch the point and shape the underside of the shell. Turn the model over.

19



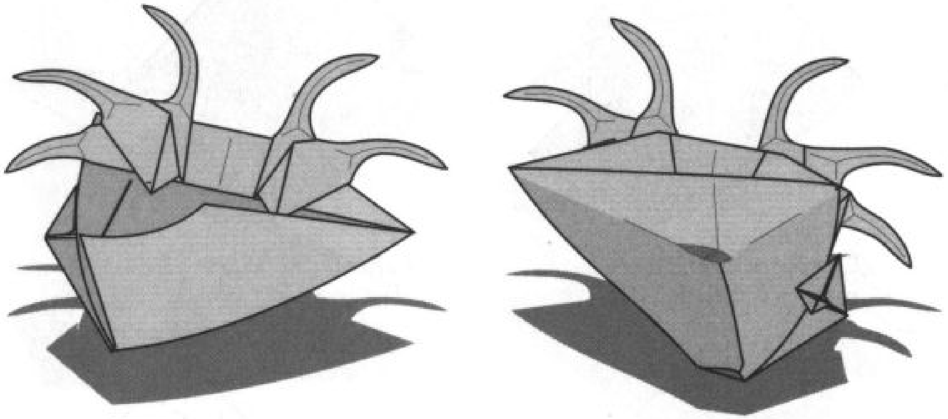
Push in these corners.

20



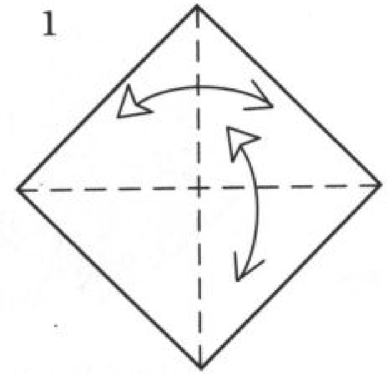
Hawk-Wing Conch

Spider Conch



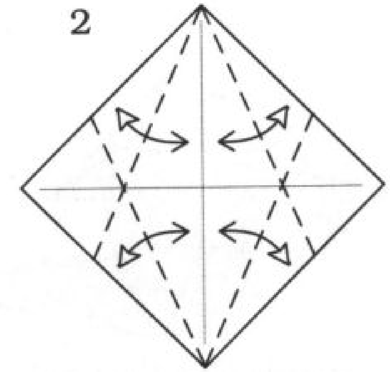
The spider conchs (genus *Lambis*) are large, conical shells distinguished by several long projections along the edge of their aperture lips, which may be long, short, knobby, or smooth, depending on the species. For this reason, they are popular among shell collectors. They range in size from four inches to about one foot in length and are predominantly tan on the outside with a pink inner surface. All members of the genus are found in the Indo-Pacific region, from southern Africa through Malaysia, Australia, and nearly to the coast of South America.

1



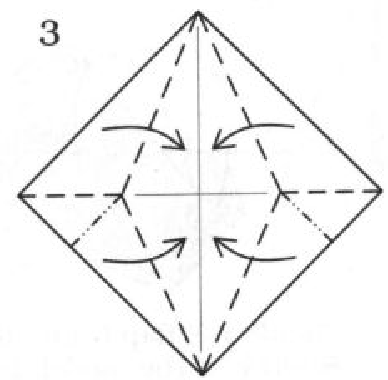
Crease the diagonals.

2



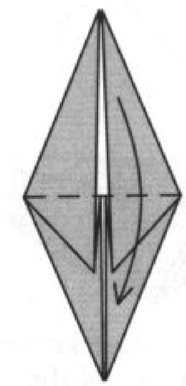
Bring the sides to the center line and unfold.

3



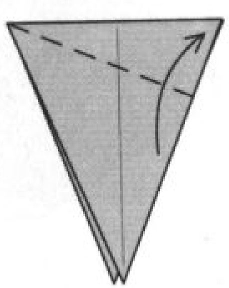
Fold a Fish Base.

4



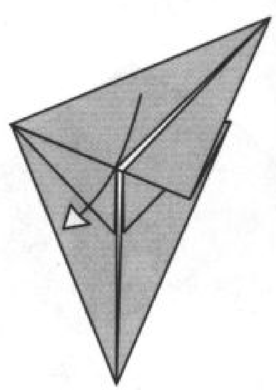
Fold the Fish Base in half.

5



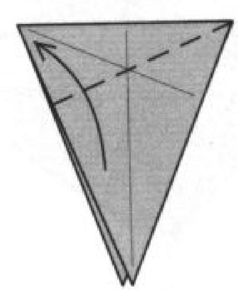
Fold one flap up so that the right edges are parallel.

6



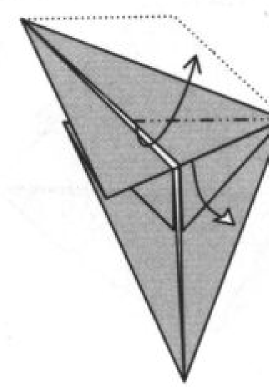
Unfold.

7



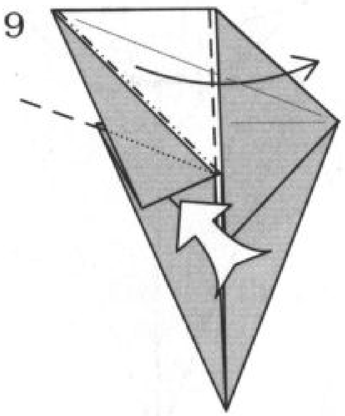
Fold the flap up so that the left edges are parallel.

8



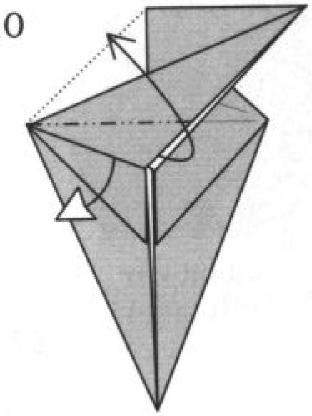
Pull out the trapped layers of paper.

9



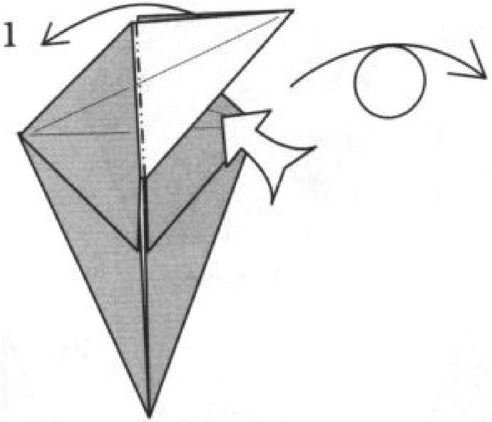
Squash-fold.

10



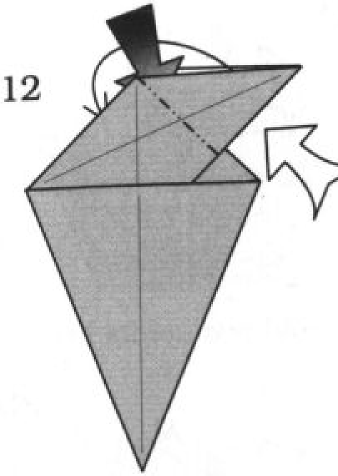
Pull out the loose paper.

11



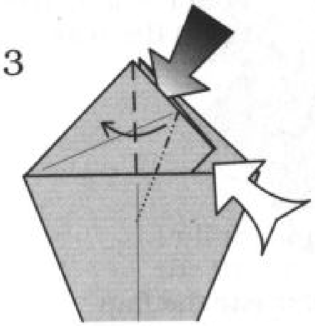
Reverse-fold. Turn the paper over.

12



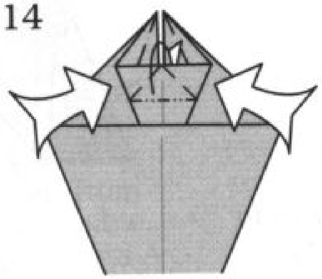
Reverse-fold the corner.

13



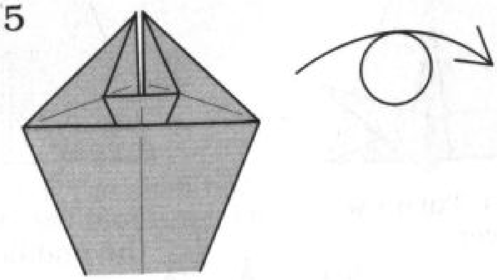
Squash-fold the corner.

14



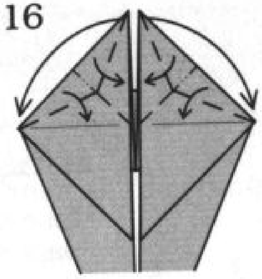
Inside petal fold.

15



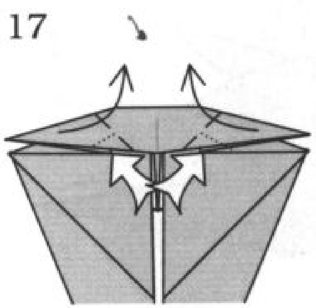
Like this. Turn the paper over.

16



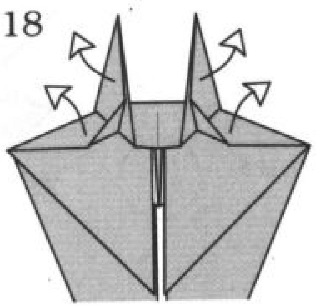
Rabbit-ear the two flaps.

17



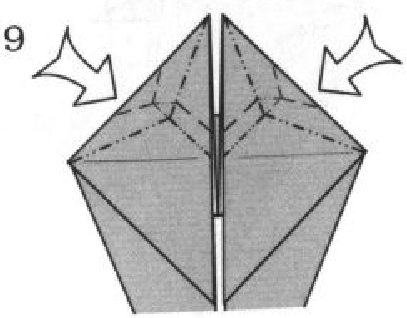
Fold the two points upward and squash-fold the tiny gussets at the bottom.

18



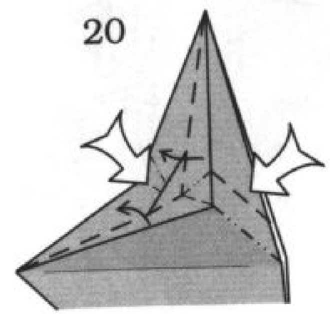
Unfold to step 16.

19



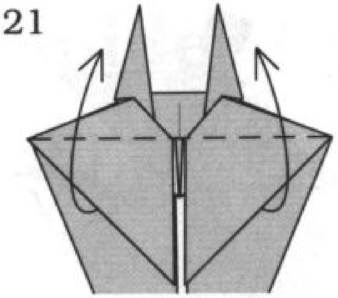
Sink the edges symmetrically.

20



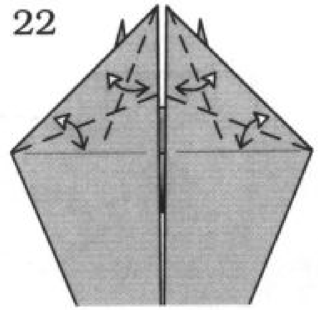
Enlarged view, showing the creases in the interior.

21



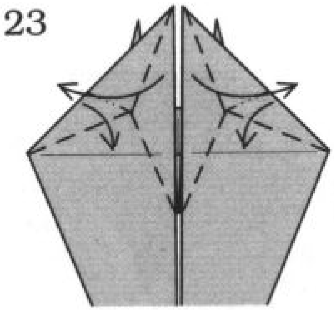
Fold two points up.

22



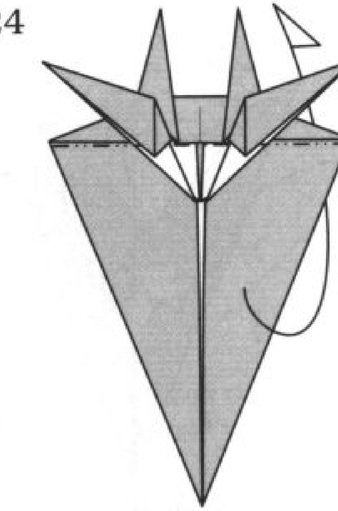
Crease.

23



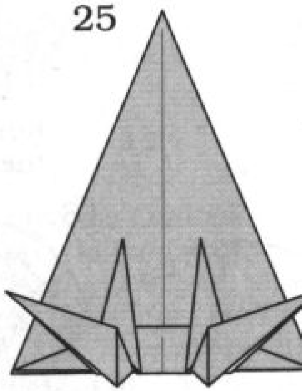
Rabbit-ear both points.

24



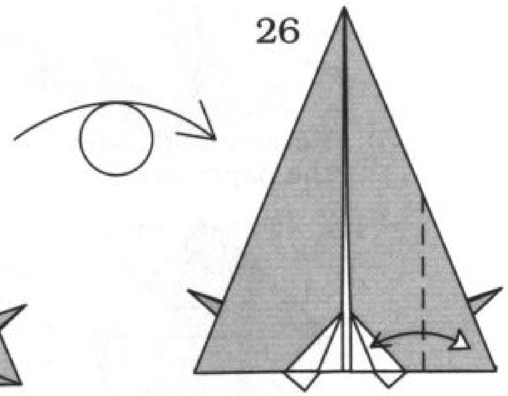
Fold the long point up to the rear.

25



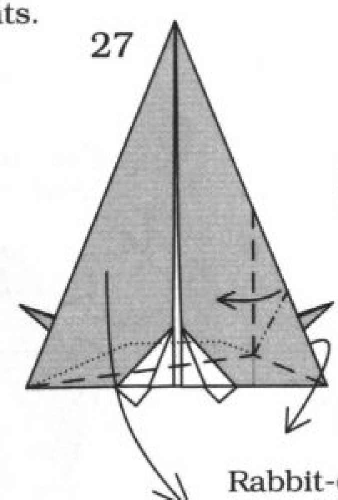
Like this. Turn the paper over.

26



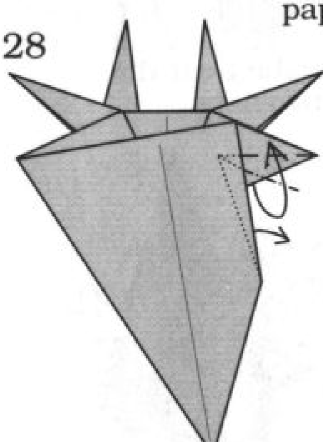
Fold the right corner in to the middle and unfold.

27



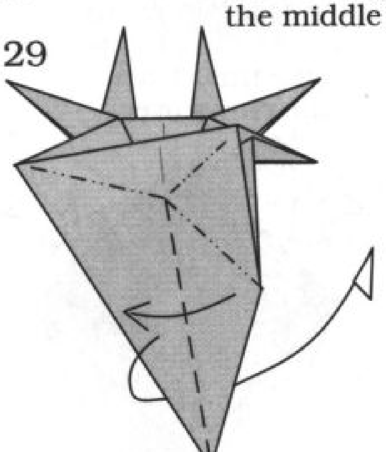
Rabbit-ear the flap on existing creases.

28



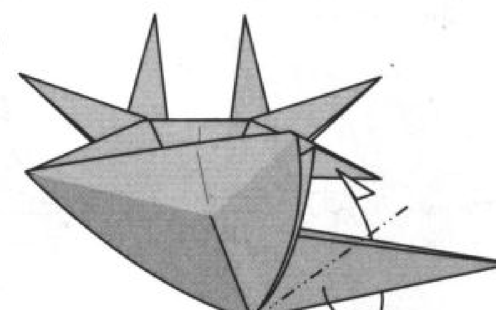
Swivel fold.

29



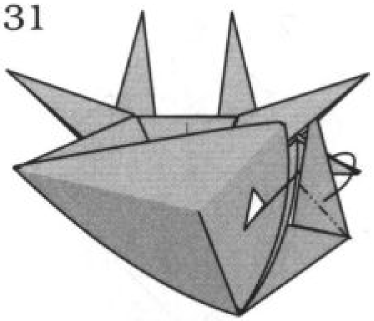
Pinch the bottom of the point in half and swing it up to the right. The model becomes three-dimensional.

30



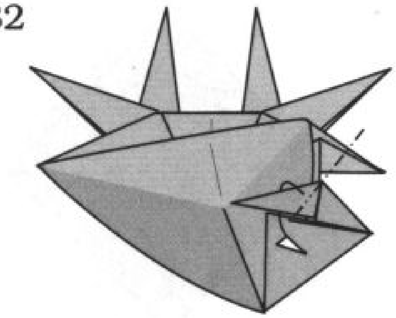
Mountain-fold the flap behind. This locks the folds from step 29 into place.

31



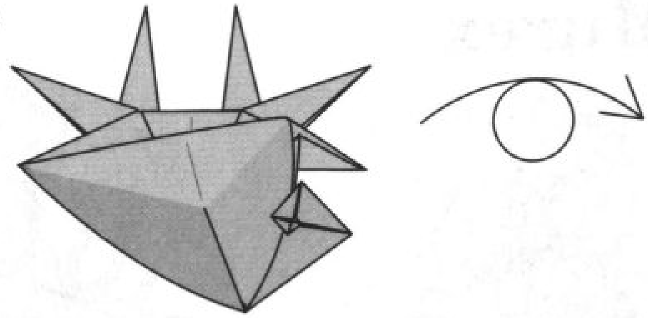
Mountain-fold the point behind again.

32



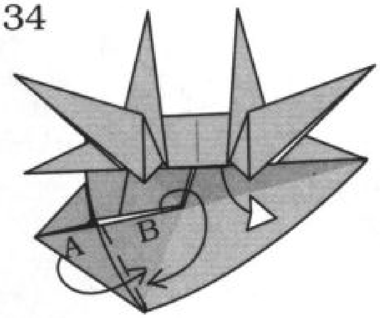
Continue until you run out of point.

33



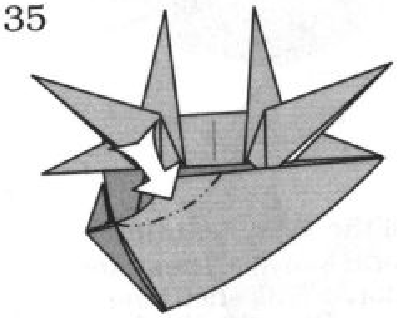
Like this. Turn the paper over.

34



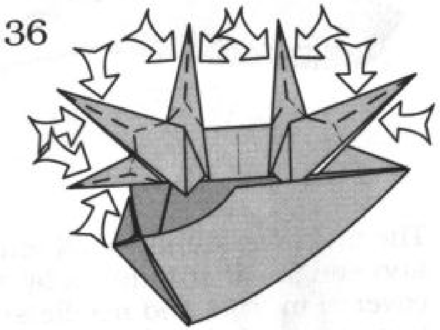
Pull the loose paper out from the interior as far as possible. Simultaneously bring points A and B together.

35



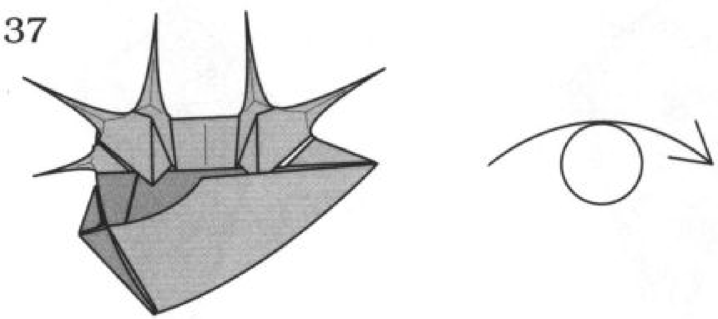
Push in the shell here to make the underside rounded.

36



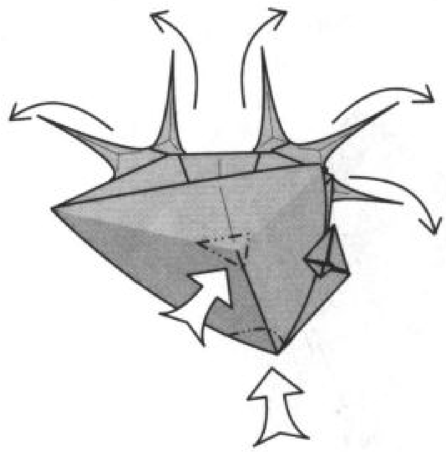
Pinch all the points.

37



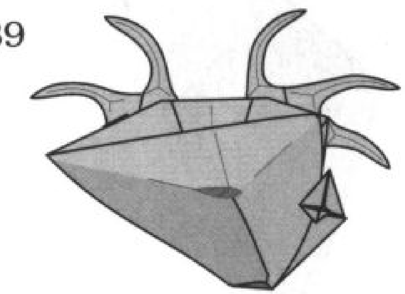
Like this. Turn the paper over.

38



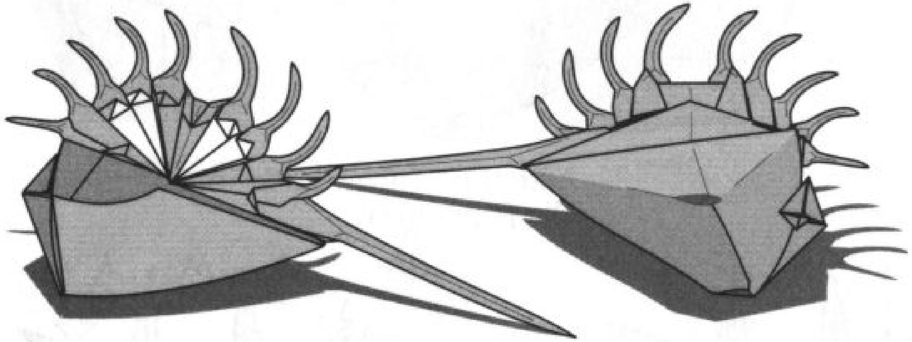
Sink the corners of the shell and curve the points.

39



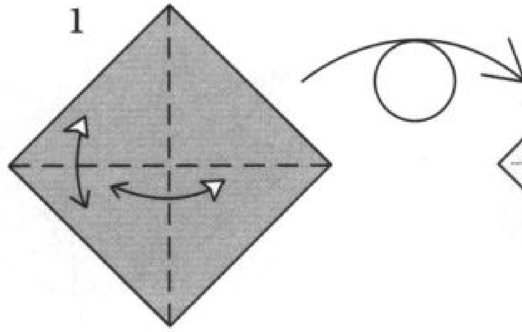
Spider Conch

Murex



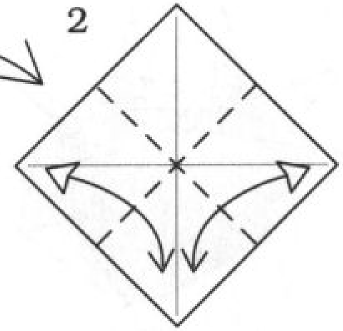
The murexes (family *Muricidae*) are one of the most beautiful and sought-after families by shell collectors. Many of them are covered in frills and needle-sharp projections. This shell, the Venus's comb, has a row of needles along the lip of the shell. Venus's combs are pure white outside and delicately pink inside, and are roughly five inches long. Murexes are found in tropical and temperate waters worldwide.

1



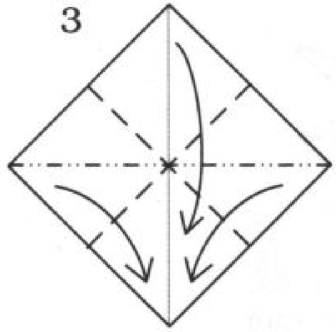
Crease the diagonals. Turn the model over.

2



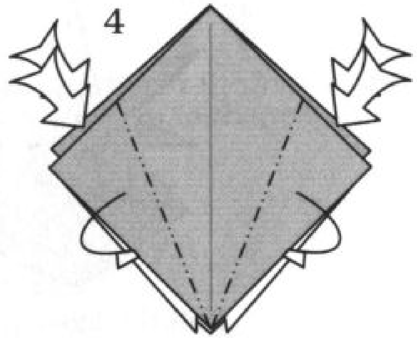
Crease in half and unfold.

3



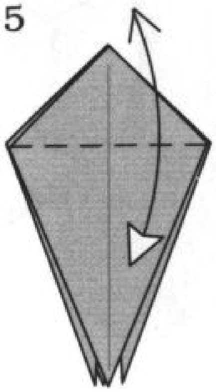
Fold a Preliminary Fold.

4



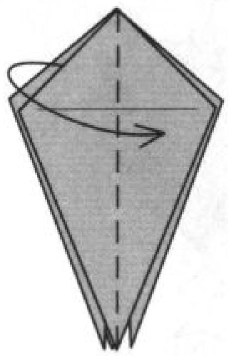
Enlarged view. Reverse-fold four corners to make a Bird Base.

5



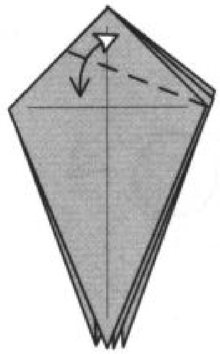
Enlarged view. Fold and unfold.

6



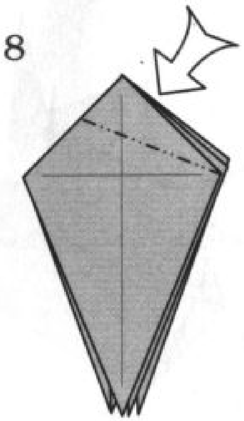
Fold one layer over from left to right.

7



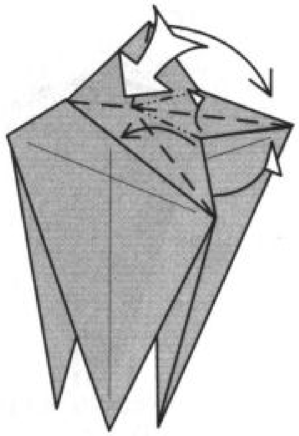
Crease.

8



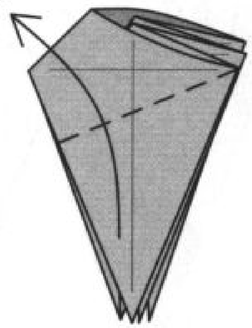
Open the top point out and sink it on the existing creases.

9



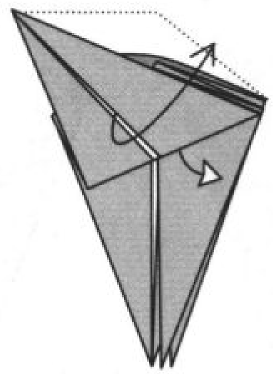
In progress.

10



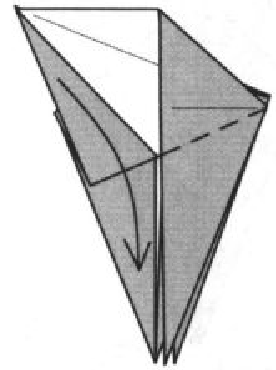
Fold the flap up.

11



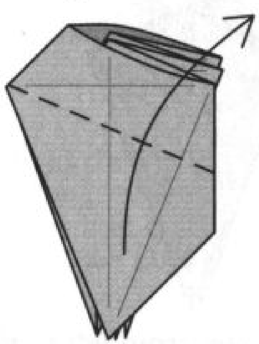
Pull out the trapped layers of paper.

12



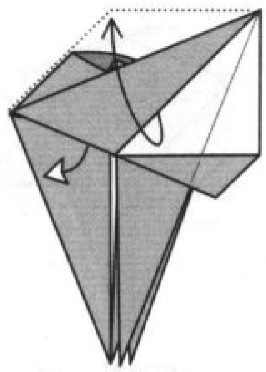
Fold the flap back down.

13



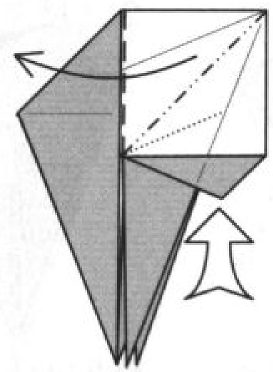
Fold the flap up.

14



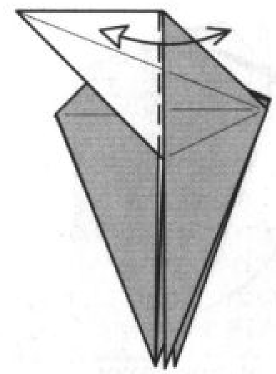
Pull out the trapped layers of paper.

15



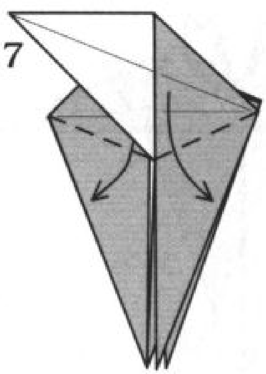
Squash-fold.

16



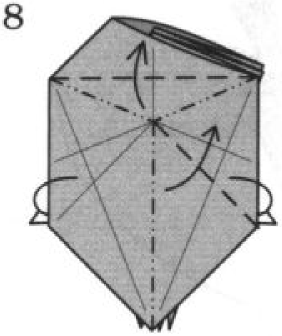
Fold and unfold.

17



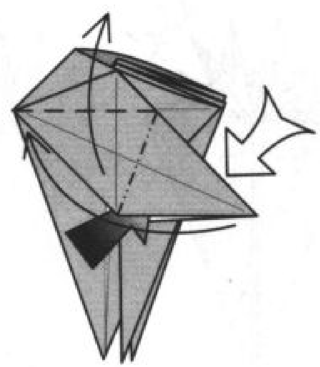
Open out and down.

18



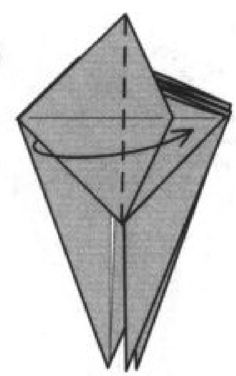
Refold on existing creases.

19



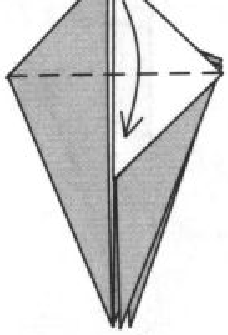
Squash-fold.

20



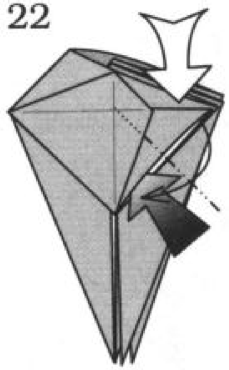
Fold a single layer from left to right.

21



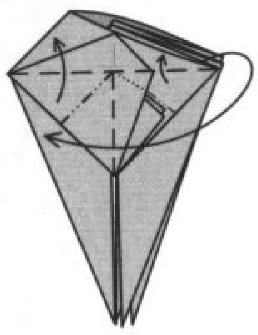
Fold down.

22



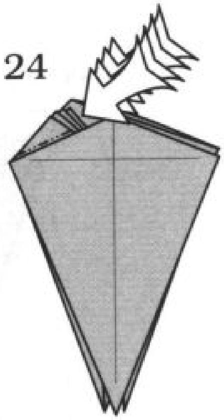
Reverse-fold.

23



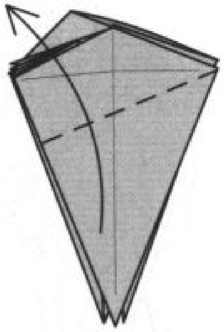
Fold one layer from right to left, incorporating the reverse fold shown.

24



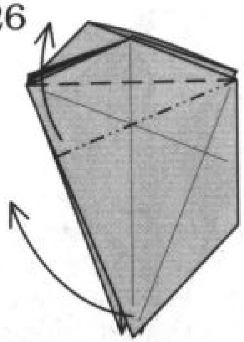
Reverse-fold four edges.

25



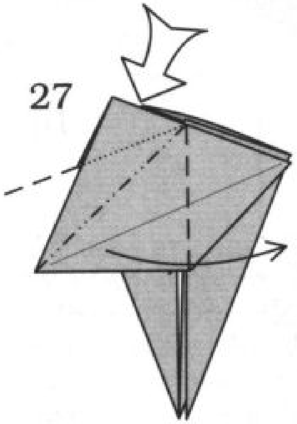
Repeat steps 10-12.

26



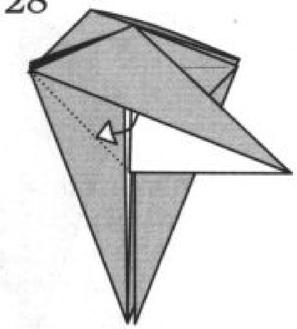
Pleat one layer.

27



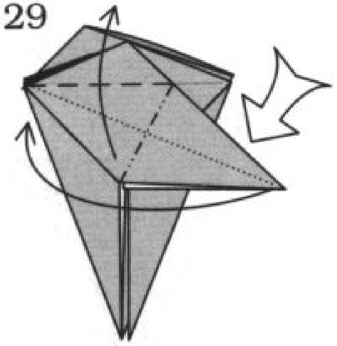
Squash the flap over to the right.

28



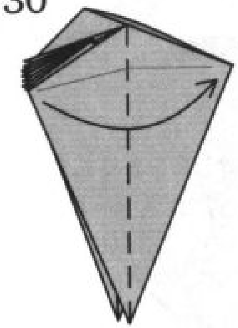
Pull the loose paper out as far as possible.

29



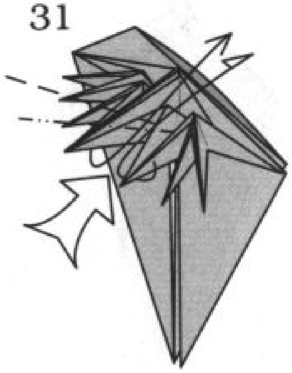
Repeat steps 19-24.

30



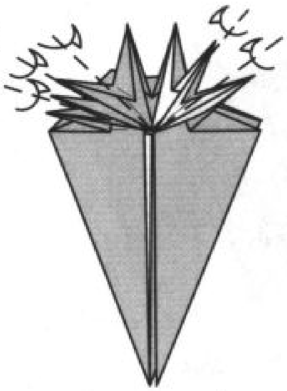
Fold one layer from left to right and fan the small points.

31



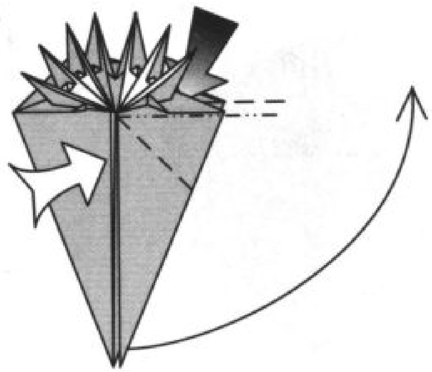
Twist and stretch upward the two points shown.

32



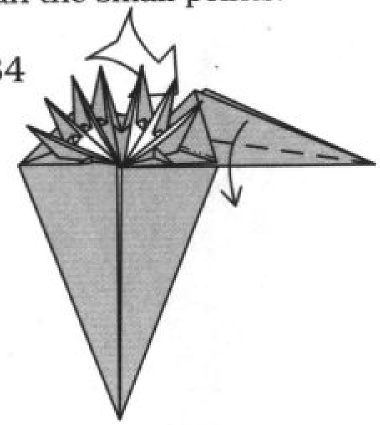
Twist the other five points and flatten the paper out.

33



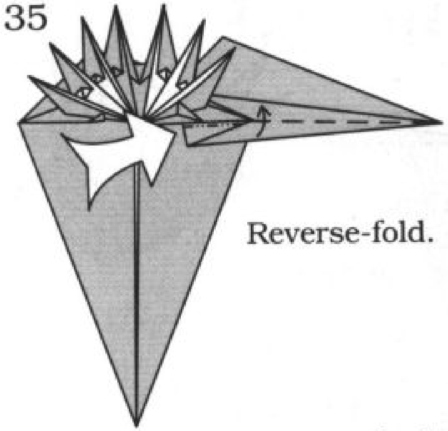
Reverse-fold the long point.

34



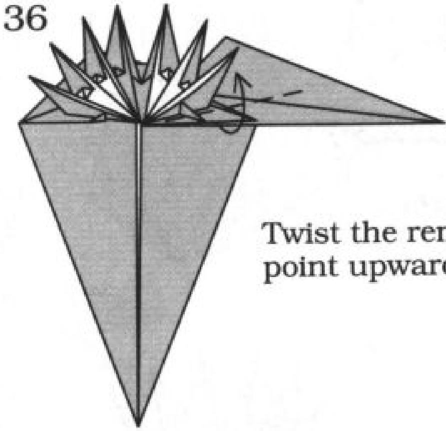
Reverse-fold one layer only.

35



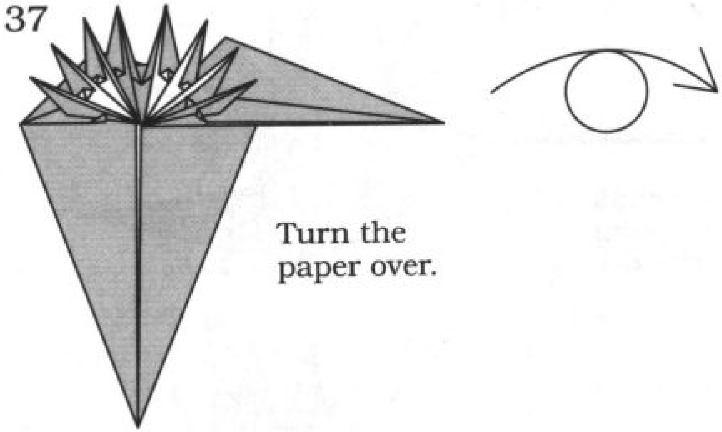
Reverse-fold.

36



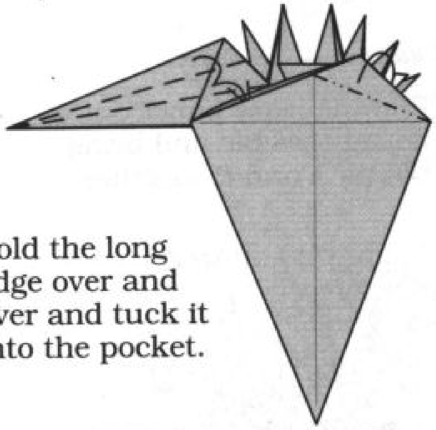
Twist the remaining point upward.

37



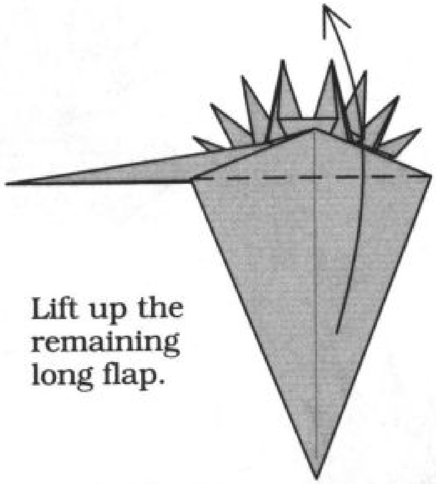
Turn the paper over.

38



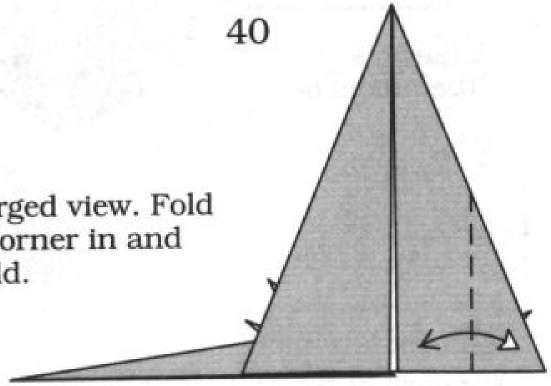
Fold the long edge over and over and tuck it into the pocket.

39



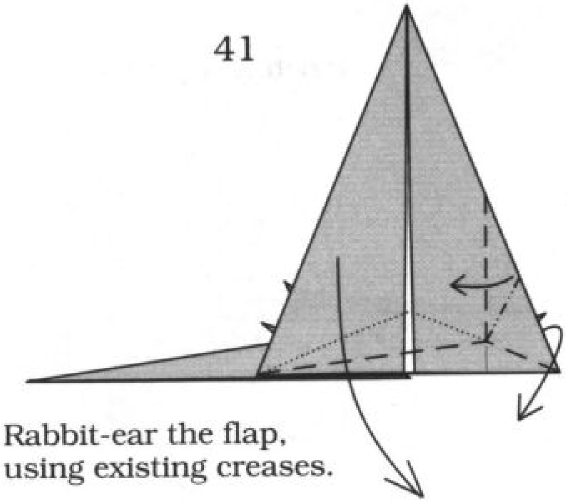
Lift up the remaining long flap.

40



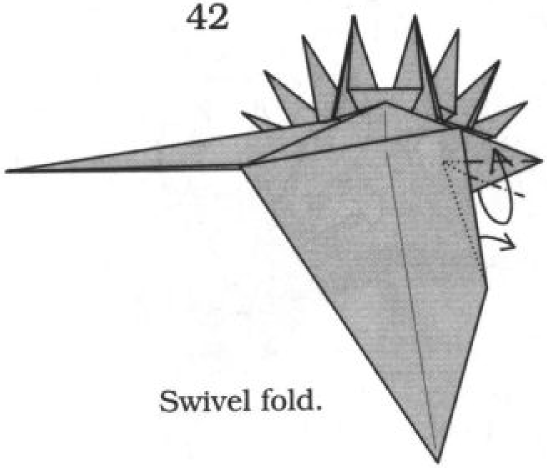
Enlarged view. Fold the corner in and unfold.

41



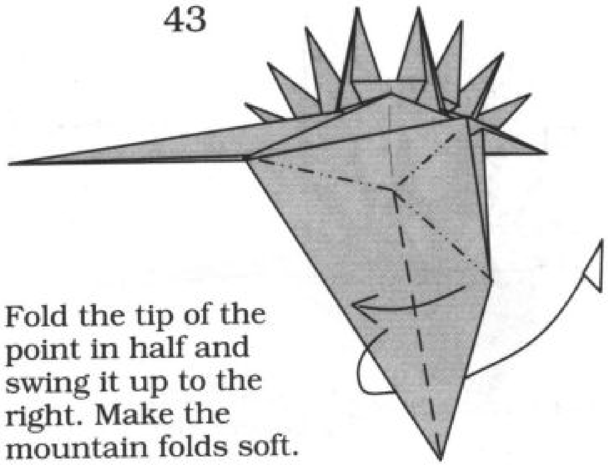
Rabbit-ear the flap, using existing creases.

42



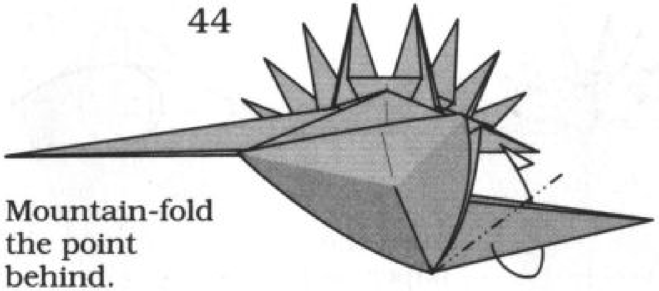
Swivel fold.

43



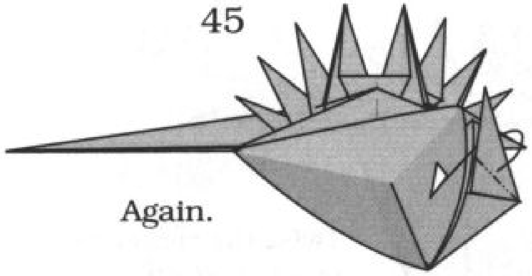
Fold the tip of the point in half and swing it up to the right. Make the mountain folds soft.

44



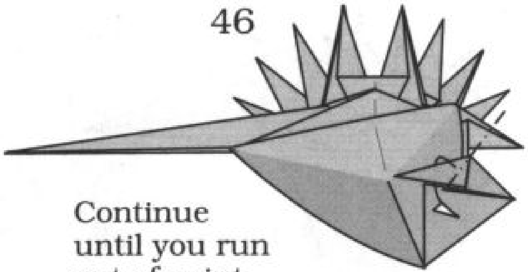
Mountain-fold the point behind.

45



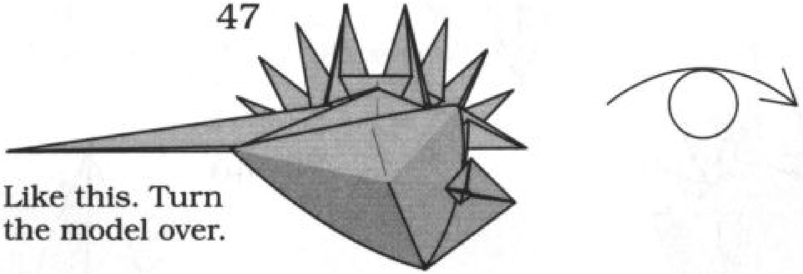
Again.

46



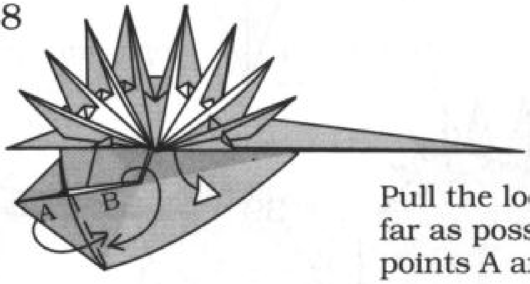
Continue until you run out of point.

47



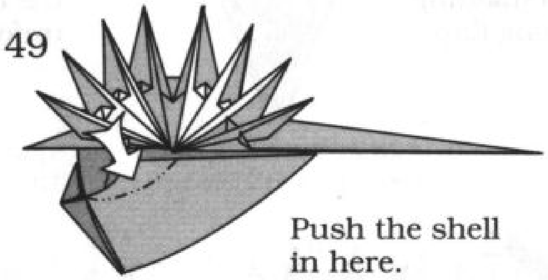
Like this. Turn the model over.

48



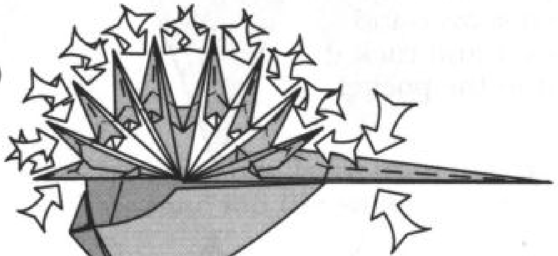
Pull the loose paper out as far as possible and bring points A and B together.

49



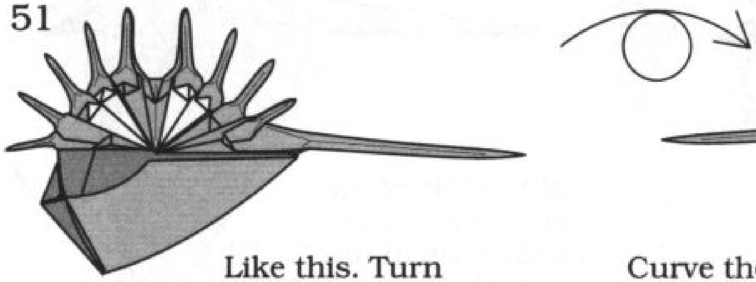
Push the shell in here.

50



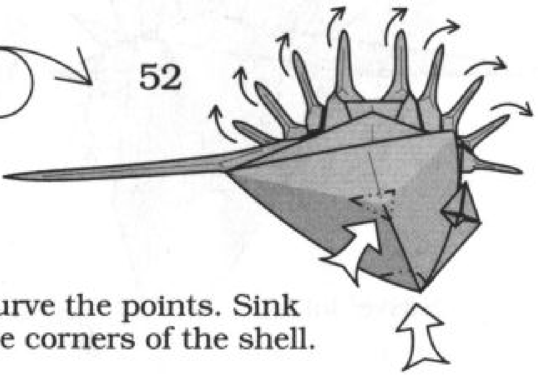
Pinch all of the points.

51



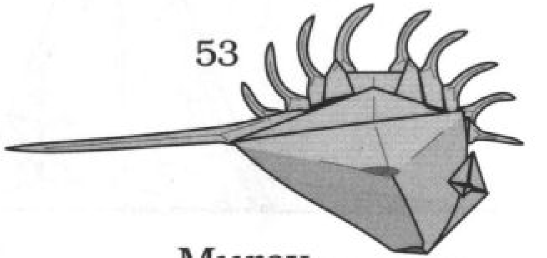
Like this. Turn the paper over.

52



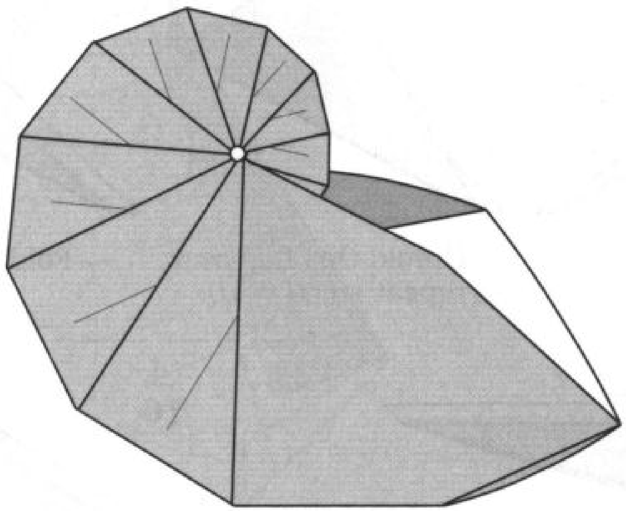
Curve the points. Sink the corners of the shell.

53



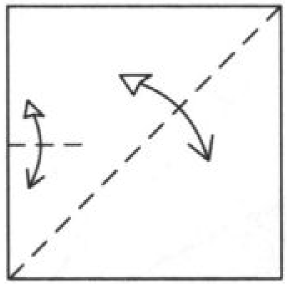
Murex

Chambered Nautilus Shell



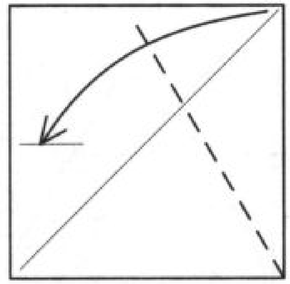
The Chambered Nautilus (*Nautilus pompilius*) is one of the oldest of the cephalopods, a group that includes the octopus and squid. It is highly valued for its symmetric shell, which forms a logarithmic spiral in cross section. The Nautilus is native to the Indian and Pacific Oceans.

1



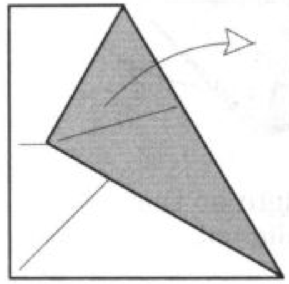
Crease the diagonal of the square and make a pinch mark along the left side halfway up.

2



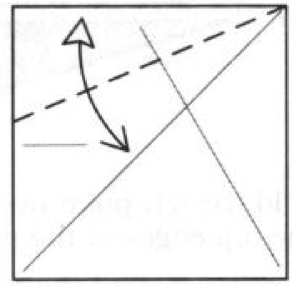
Fold the top right corner down to the pinch mark you just made.

3



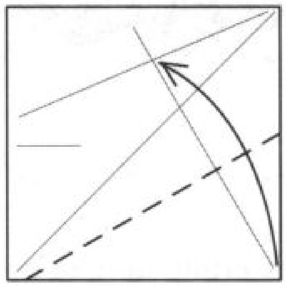
Unfold.

4



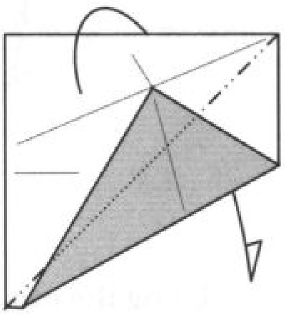
Fold the top edge down to lie along the diagonal.

5



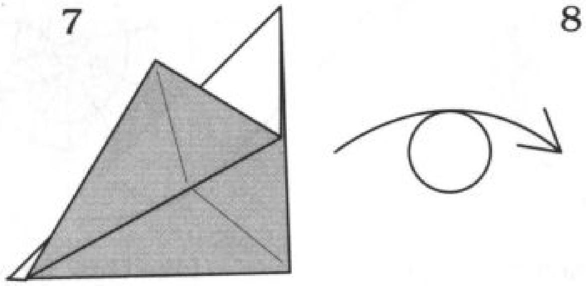
Fold the bottom right corner up to touch the intersection of the last two creases.

6



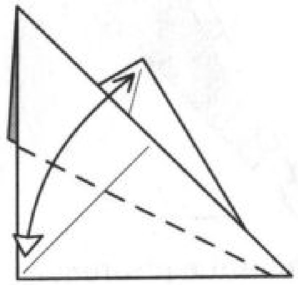
Fold the corner behind along the diagonal of the square.

7



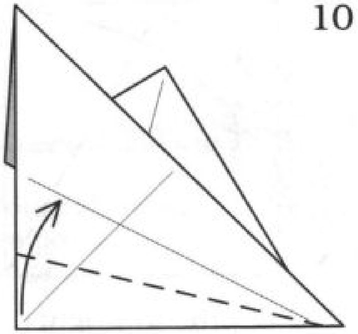
Like this. Turn the paper over.

8



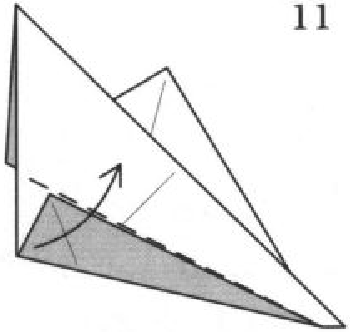
Fold the bottom left corner up to match the one behind and unfold.

9



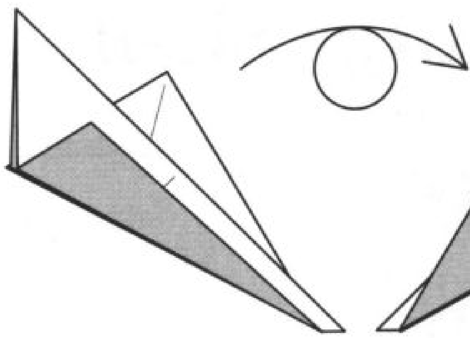
Fold the edge up to touch the crease you just made.

10



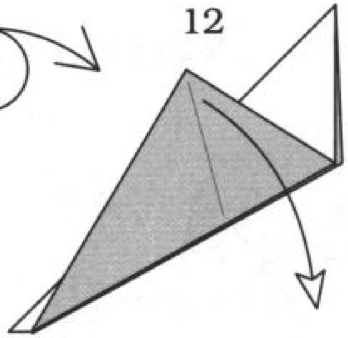
Fold up on the existing crease.

11



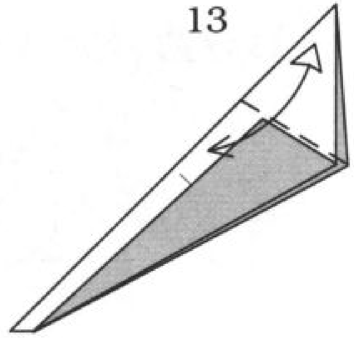
Turn the paper over.

12



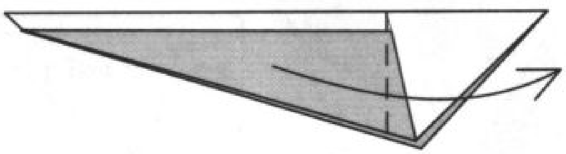
Unfold this flap and repeat steps 9–10.

13



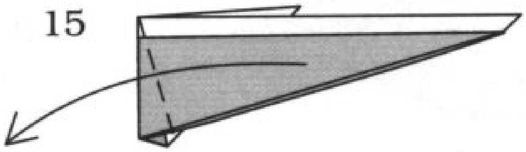
Fold and unfold.

14



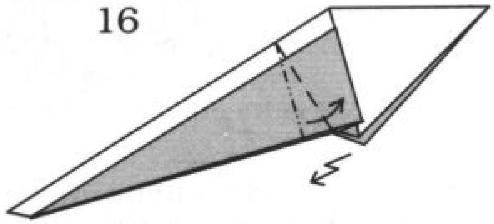
Fold the left point over to the right so that the top edges of the point are aligned.

15



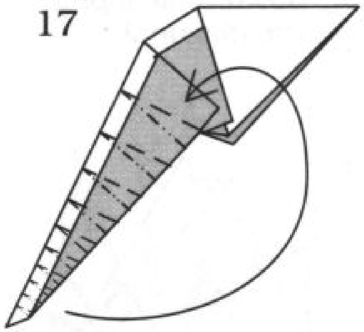
Fold the point back to the left so that the bottom edges of the point are aligned.

16



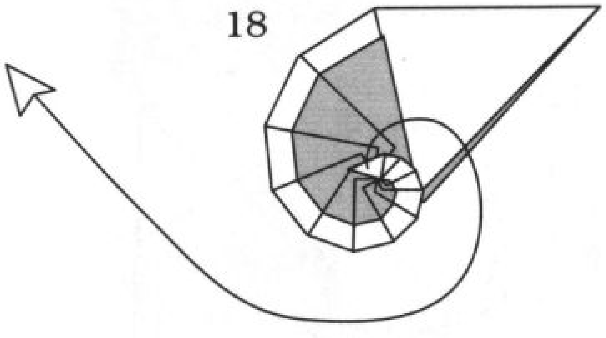
Repeat steps 14–15. Note the location of the valley fold.

17



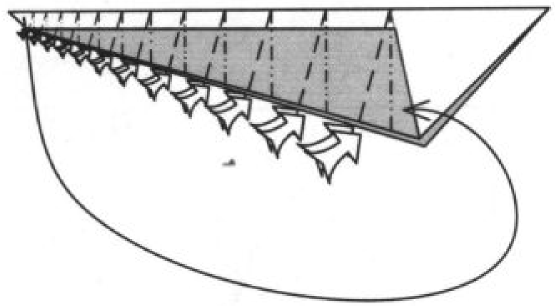
Continue pleating as in steps 14–15 until you get to the end of the colored part of the point (for a total of about 12 or13 pleats).

18



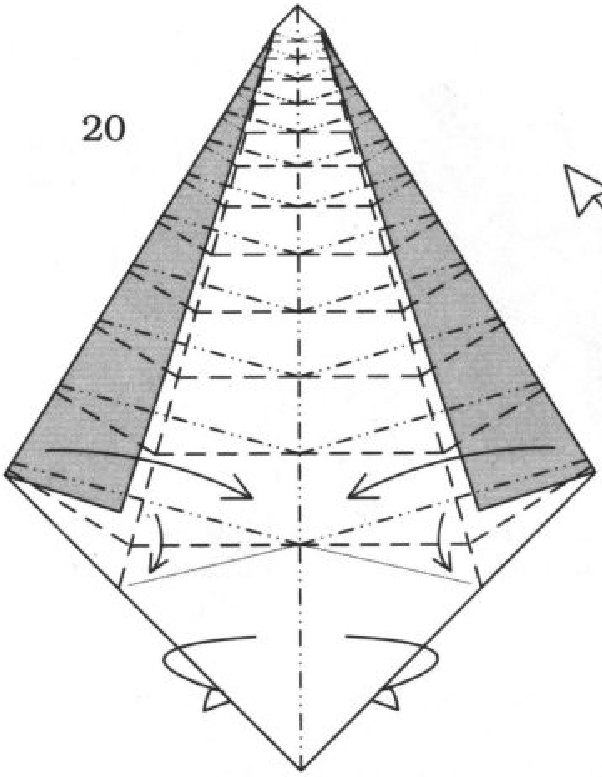
Like this. Unfold to step 13.

19



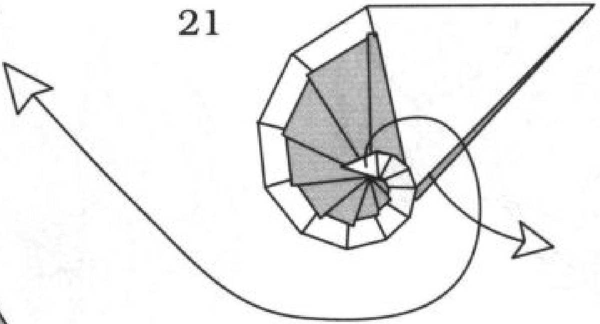
Using the existing creases, crimp both of the bottom edges so that the paper coils up again. The colored flap on the front (and the corresponding one on the back) should not be trapped in the pleats of the white layer; see step 20 for the crease pattern.

20



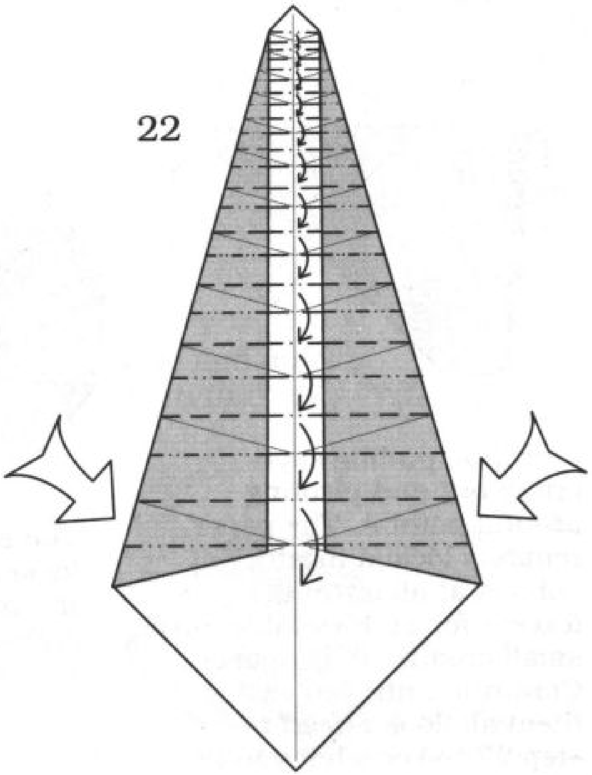
This shows the crease pattern for step 19.

21



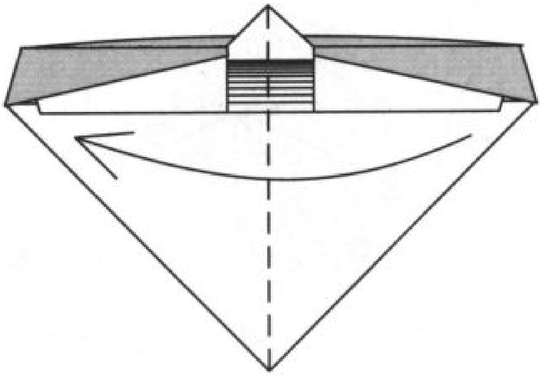
Unfold again to step 13 and open the model out flat.

22



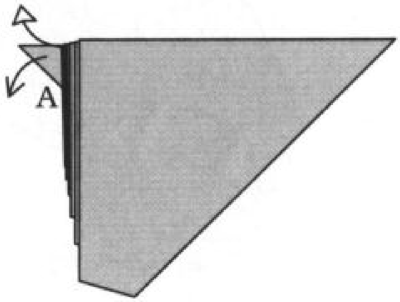
Using the existing creases as guides, crimp the point downward, folding it back and forth (push arrows are shown only for the first crimp).

23



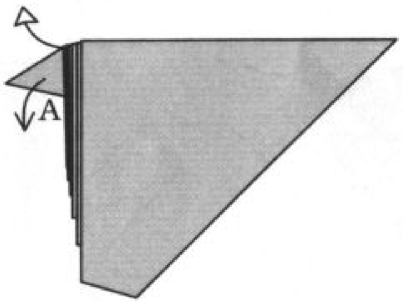
Like this. Fold the paper in half carefully (because of the many layers the model is quite thick). Rotate the model 90 degrees counterclockwise.

24



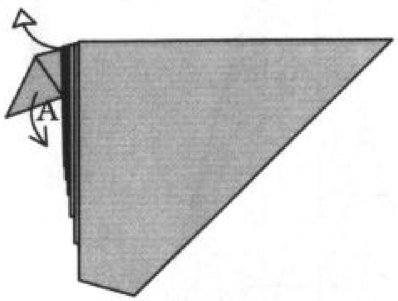
Carefully pull out the top of the protruding point and pivot it downward, taking point A as the axis of rotation. This has the effect of restoring a crimp we made in step 20.

25



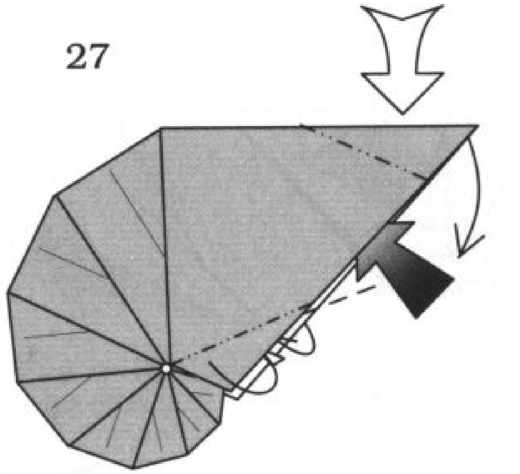
Like this. Now, carefully grasp that crimp and pull it out, again pivoting around point A; the result is to restore the next crimp.

26



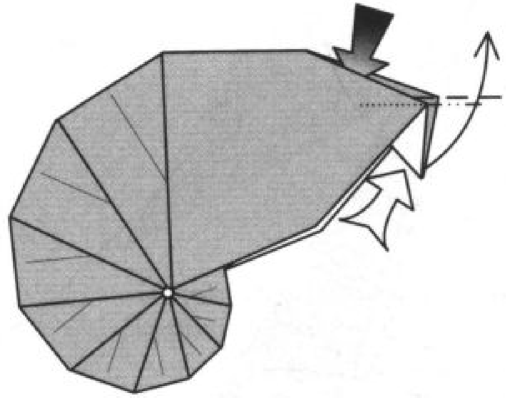
Continue pulling each crimp out and pivoting around point A. The paper remains locked together at point A at all crimps (except for an inevitable small amount of slippage). Continue until you've done them all (look ahead to step 27 to see what you're trying to accomplish).

27



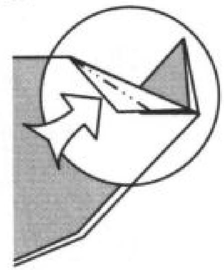
The paper should be securely locked together at the center of the rotation. Reverse-fold the top corner. Mountain-fold the corners shown. Repeat behind.

28



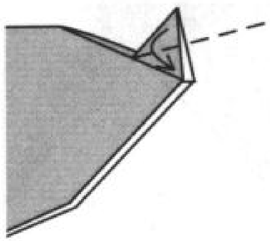
Reverse-fold the corner back up.

29



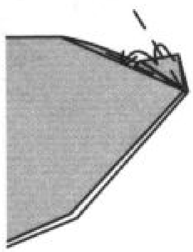
Sink the hidden corner.

30



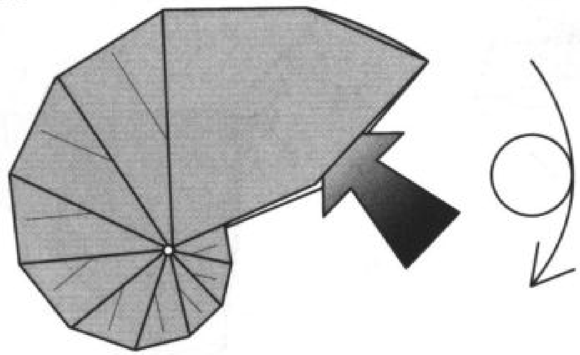
Fold the tip down.

31



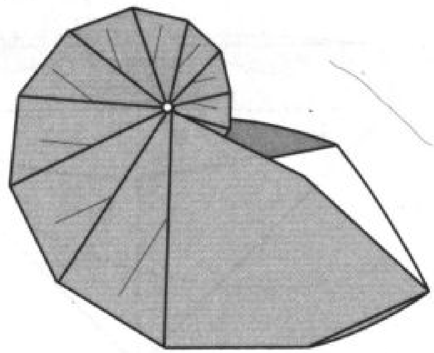
Fold the point over and over and tuck it into the pocket.

32



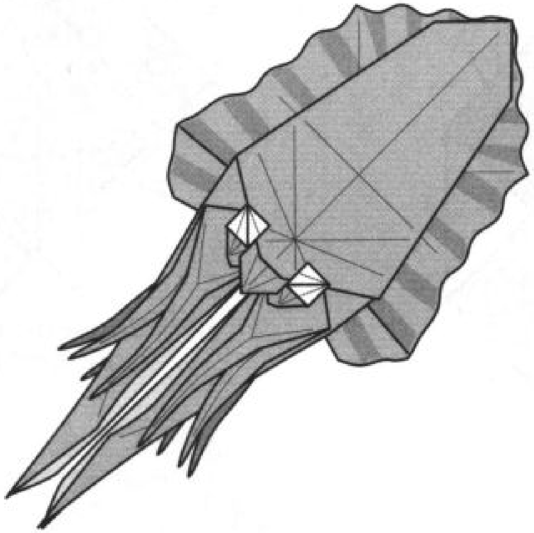
Open out the shell and turn it over.

33



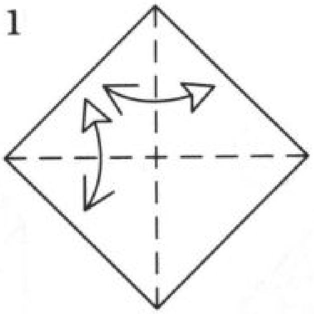
Chambered Nautilus Shell

Cuttlefish



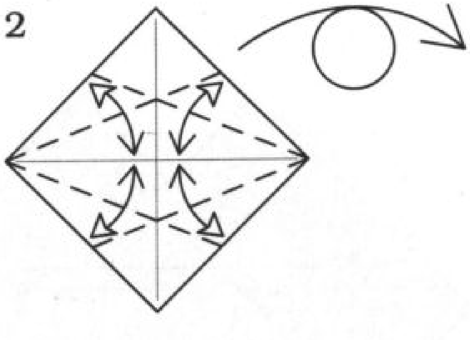
The Cuttlefish (*Sepia officinalis*), like other octopi and squid, possesses a reservoir of ink. When threatened by a predator, it ejects a blob of the ink and speeds away, leaving the predator to attack the squid-shaped globule. The ink of the cuttlefish is the original source of the dye sepia. The shell of the cuttlefish is an internal plate, which is harvested and sold as the "cuttlebone" often found in bird cages. It is found widely throughout the Atlantic Ocean and Mediterranean Sea.

1



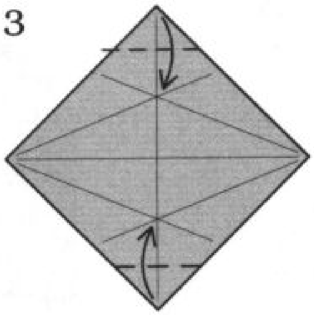
Fold and unfold.

2



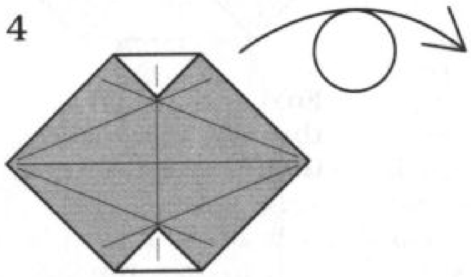
Fold and unfold.
Turn the paper over.

3



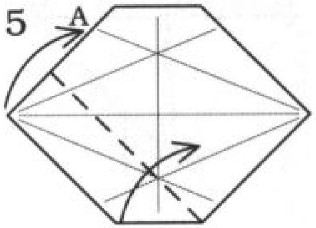
Fold the top and bottom corners to the intersections of the creases.

4



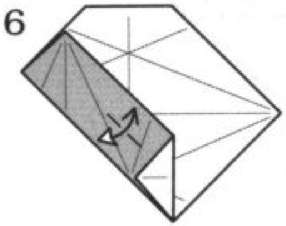
Like this. Turn the paper over.

5



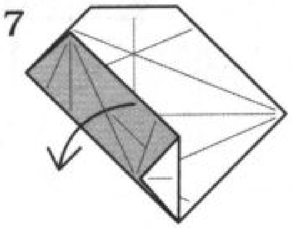
Fold the lower left edge up to point A.

6



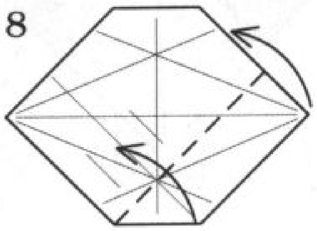
Fold and unfold, making a crease only where shown.

7



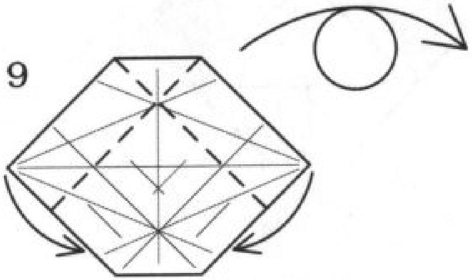
Unfold.

8



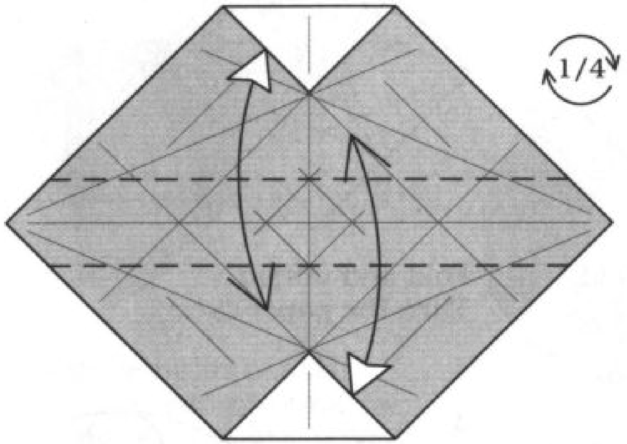
Repeat steps 5–7 on the right.

9



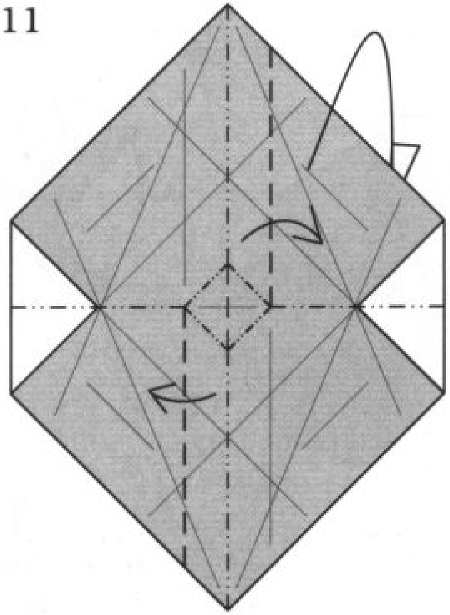
Repeat steps 5–7 on both sides of the top. Turn the paper over.

10



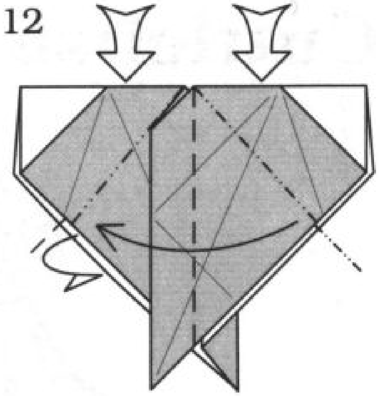
Fold and unfold through the creases, then rotate 1/4 turn.

11



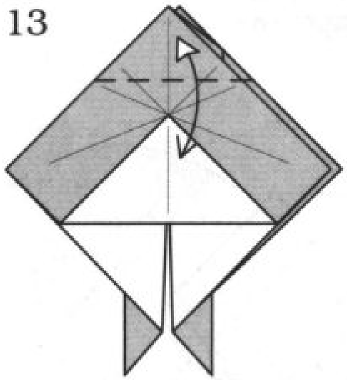
Fold, using the existing creases.

12



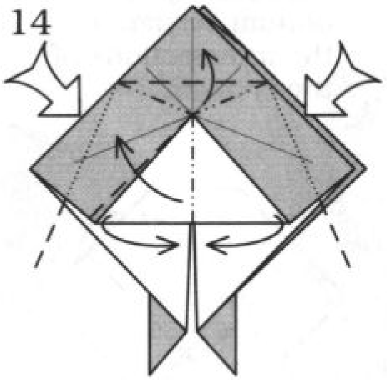
Squash-fold in front and back.

13



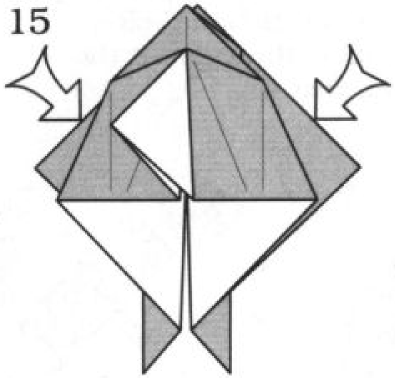
Fold and unfold.

14



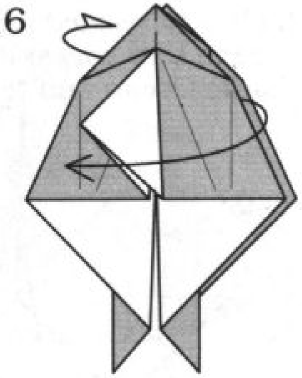
Swivel the sides in, bring the bottom corners of the white triangle together, and swing it over to one side.

15



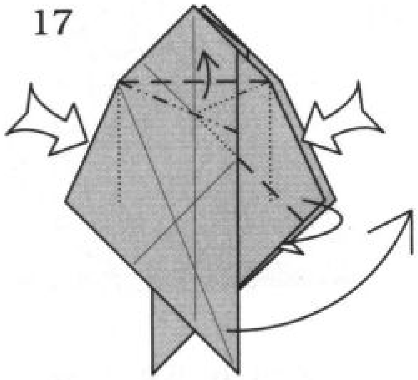
Repeat behind.

16



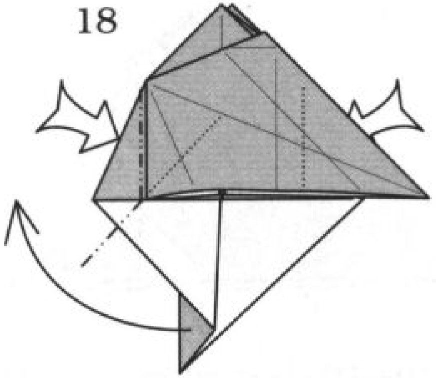
Fold one layer to the left in front and one to the right in back.

17



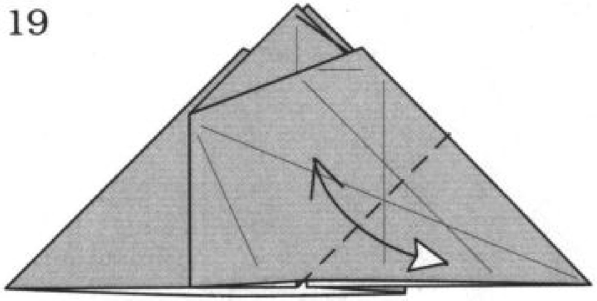
Swivel similarly to step 14.

18



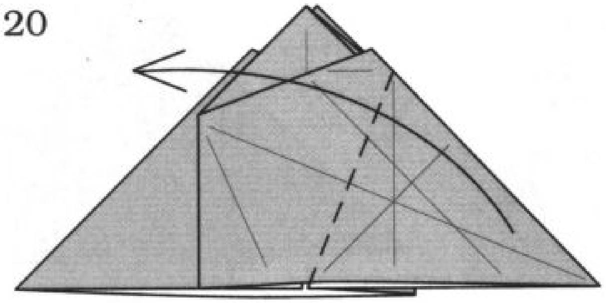
Repeat behind.

19



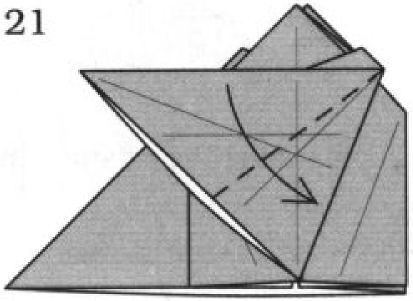
Fold and unfold.

20



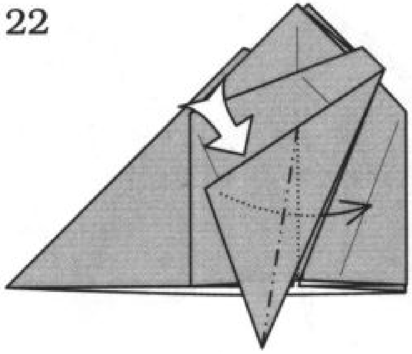
Fold the corner up to the left.

21



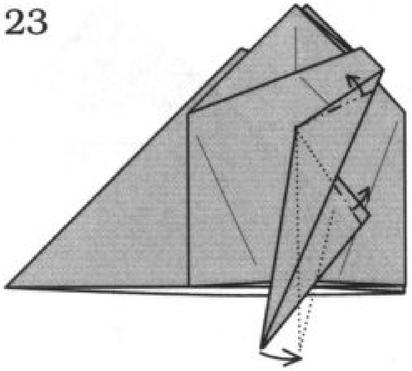
Fold the corner down to lie along the crease you just made.

22



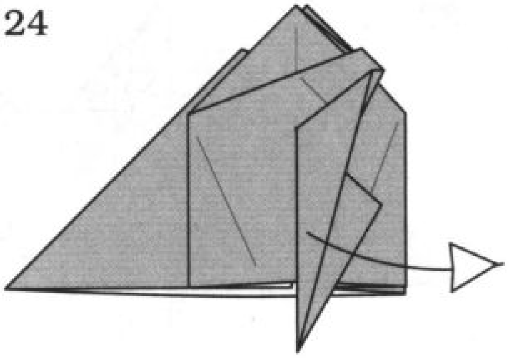
Reverse-fold both layers together.

23



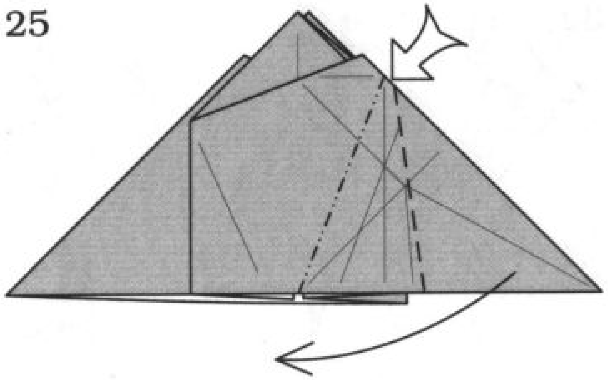
Shift the point so that its left edge becomes vertical.

24



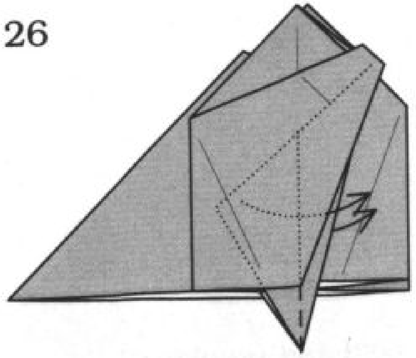
Unfold the flap.

25



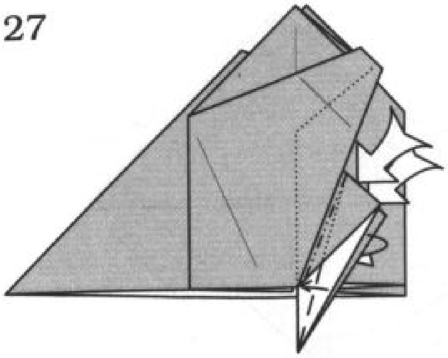
Crimp the flap symmetrically on the creases made in step 23.

26



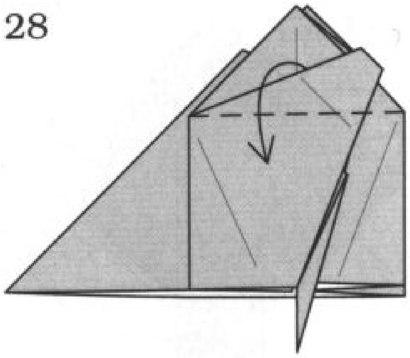
Reverse-fold both layers separately.

27



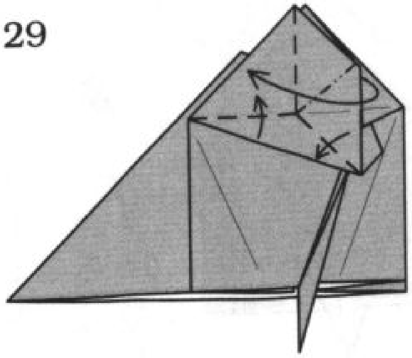
Reverse-fold both edges.

28



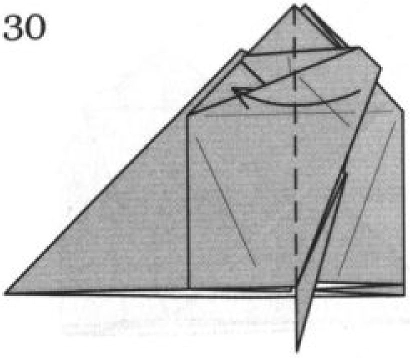
Fold the flap down as far as it will go.

29



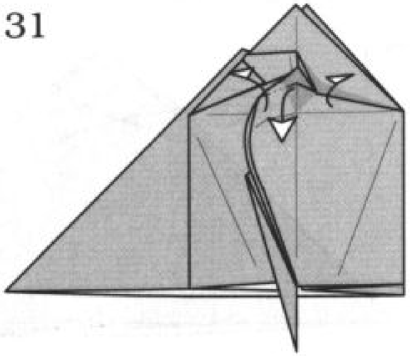
Fold it back up, incorporating the reverse fold shown.

30



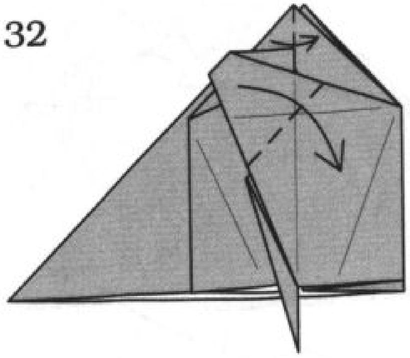
Fold the flap over to the left; it will not go all the way.

31



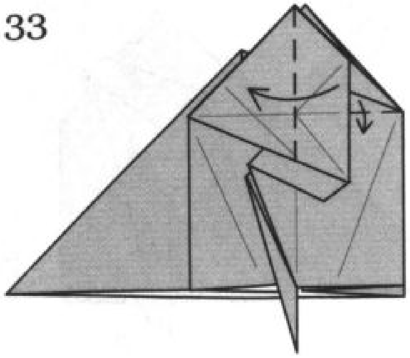
Pull the trapped paper out of the pocket and flatten the model.

32



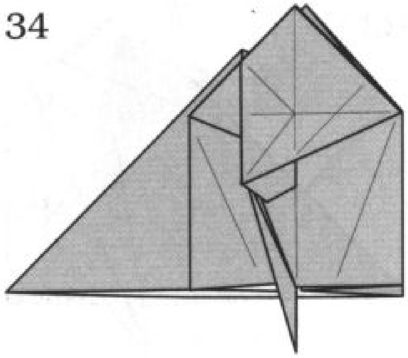
Fold the flap down to the right.

33



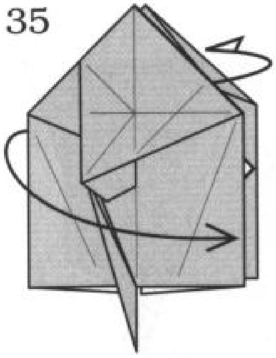
Fold the flap over to the left and swing down one layer behind.

34



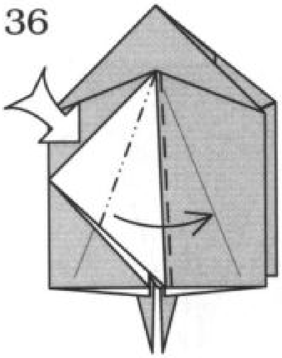
Repeat steps 19–33 on the back.

35



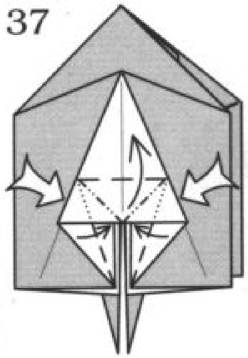
Fold one layer to the right in front and one to the left in back.

36



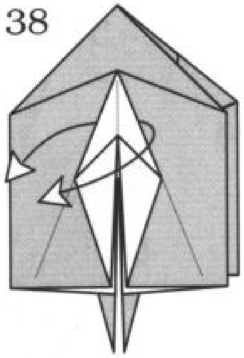
Squash-fold the white triangle.

37



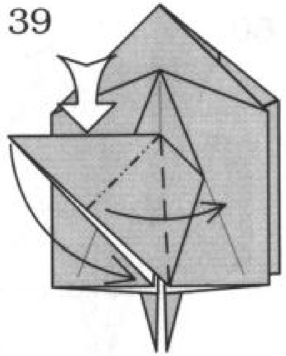
Petal-fold.

38



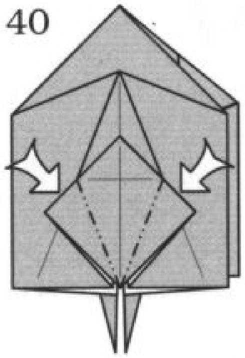
Unwrap the loose paper.

39



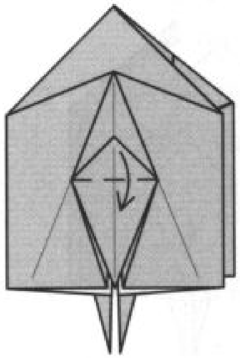
Squash-fold.

40



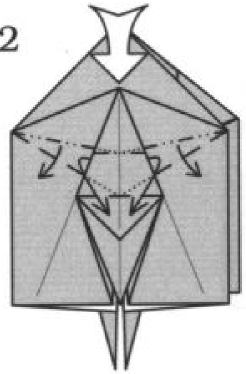
Reverse-fold the edges.

41



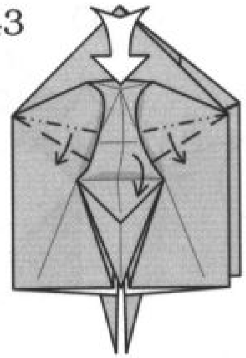
Fold the small point down.

42



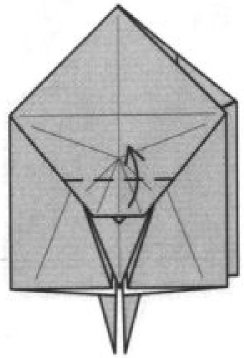
Pull the front layers down and spread-squash the point.

43



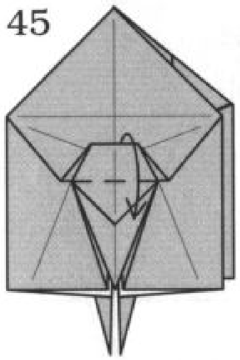
In progress.

44



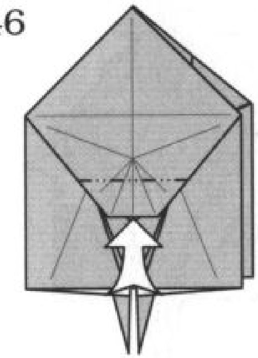
Fold a single flap upward as far as possible.

45



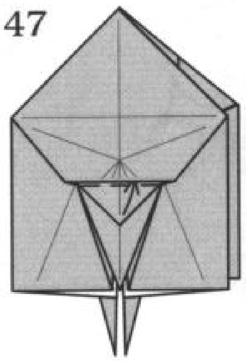
Fold the flap down again.

46



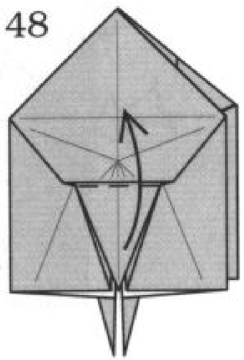
Sink the flap inside the model.

47



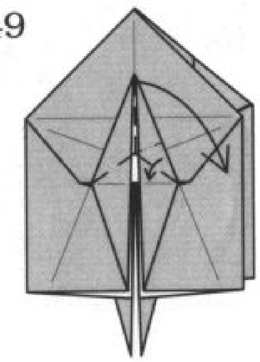
Tuck the flap up inside the pocket.

48



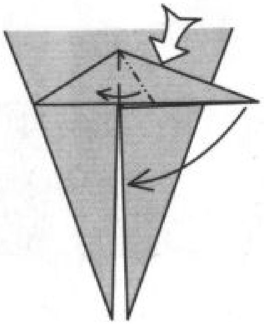
Fold the flap up.

49



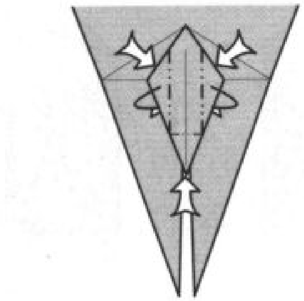
Fold a rabbit ear.

50



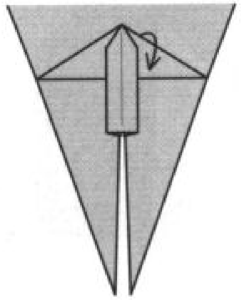
Enlarged view.
Squash-fold the point.

51



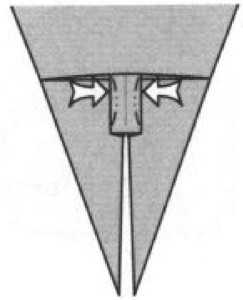
Reverse-fold the sides so they are parallel, and sink the tip of the point.

52



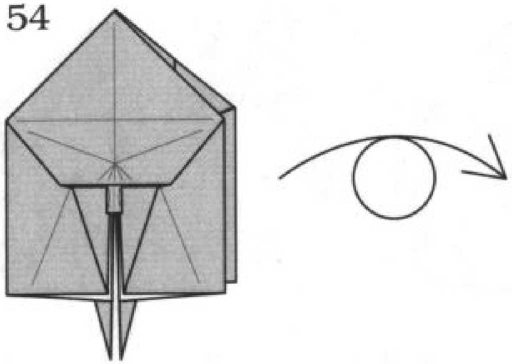
Tuck the top of the point into the pocket behind it.

53



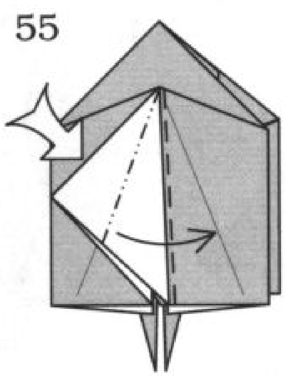
Squeeze the sides of the funnel to round it.

54



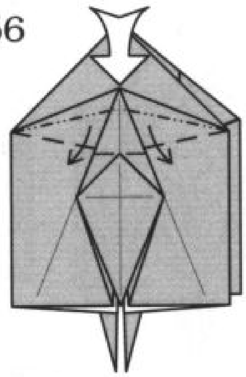
Like this. Turn the paper over.

55



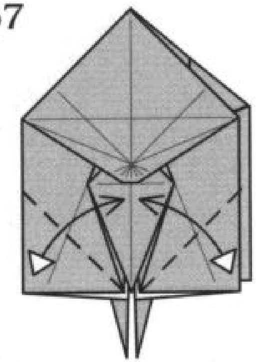
Repeat steps 36–40 on this side.

56



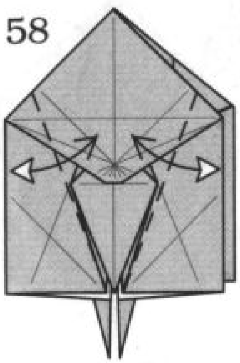
Spread-squash the point similarly to step 42 (note that the valley fold is higher here).

57



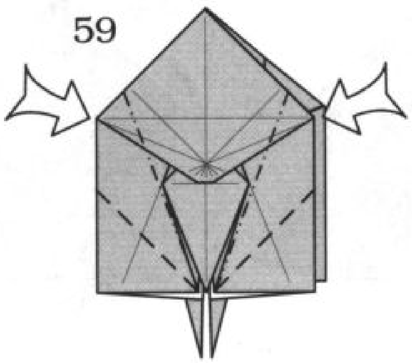
Fold and unfold.

58



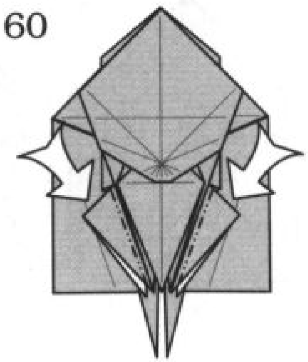
Fold and unfold.

59



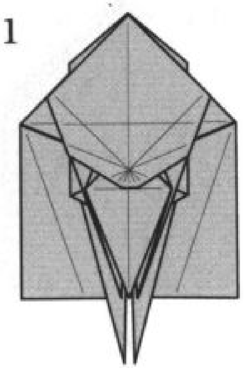
Reverse-fold each side in and out, using the existing creases.

60



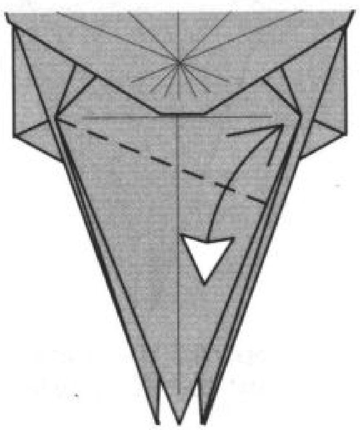
Reverse-fold the edges.

61



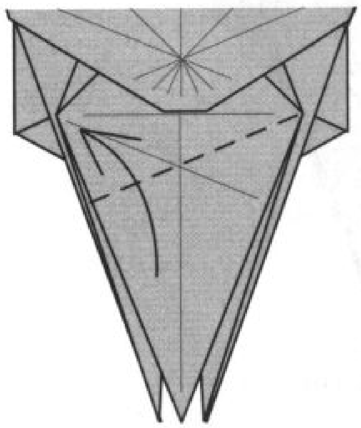
Repeat steps 57–60 behind.

62



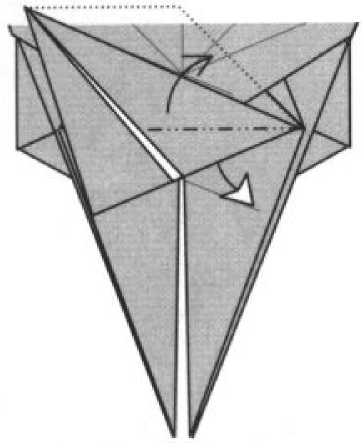
Fold and
unfold.

63



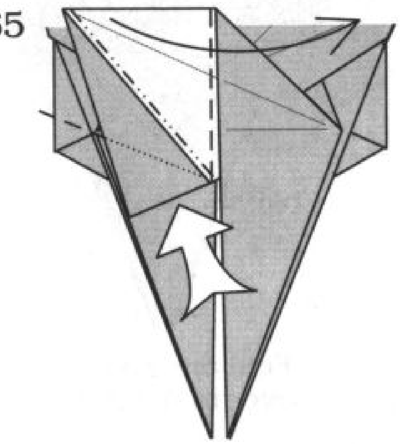
Enlarged view.
Fold the point up.

64



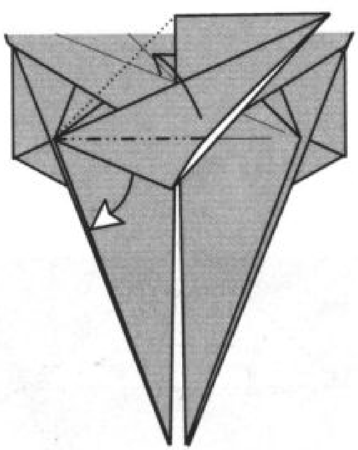
Pull out the
loose paper.

65



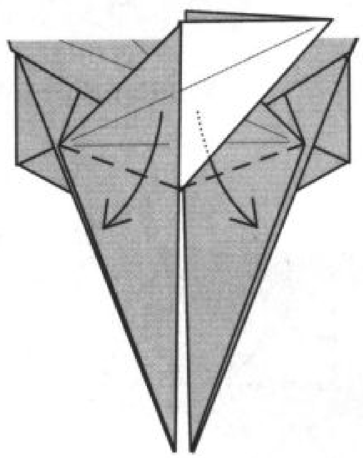
Squash-fold.

66



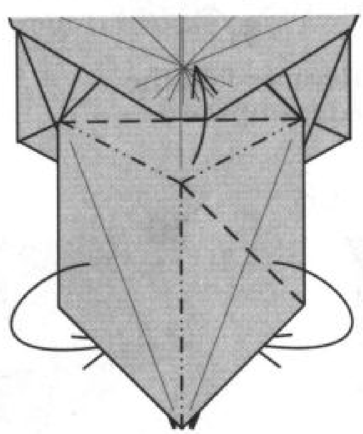
Pull out the
loose paper.

67



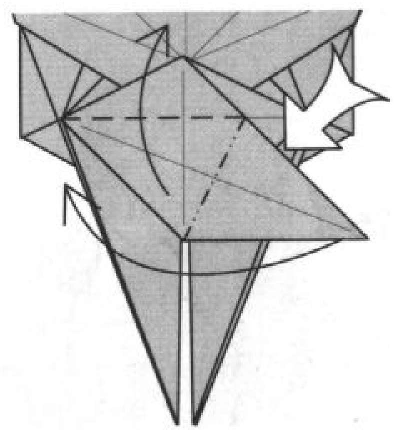
Spread the point
out and flatten it.

68



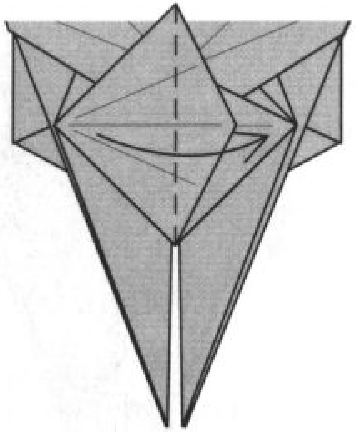
Squeeze the sides in
and swing the point
over to the right.

69



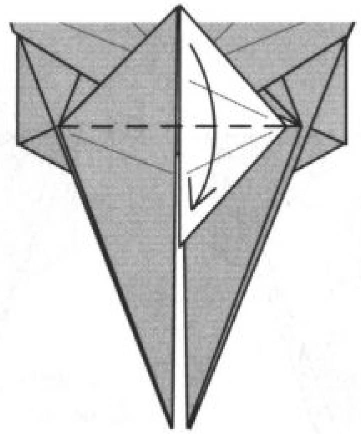
Squash-fold.

70



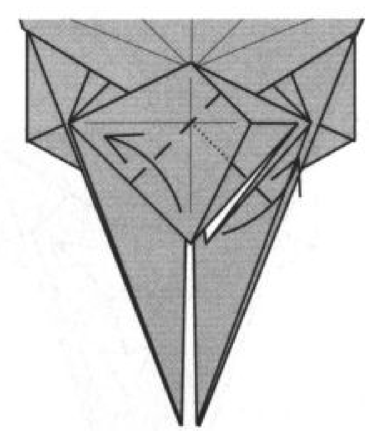
Fold one layer over to the right.

71



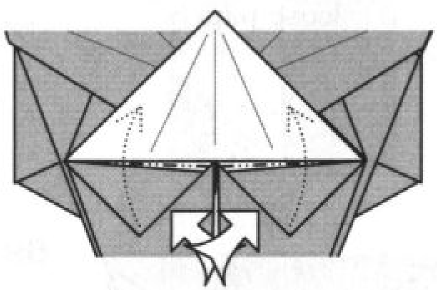
Fold the point down.

72



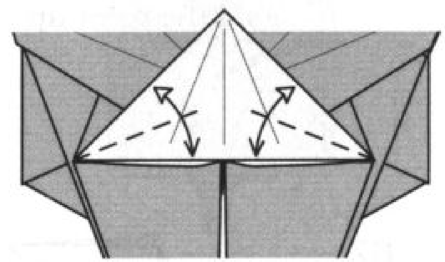
Spread the points out to either side.

73



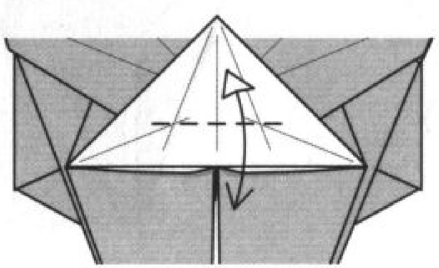
Reverse-fold the edges upward.

74



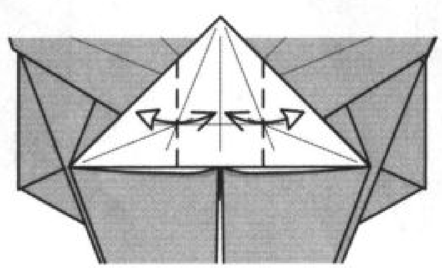
Fold and unfold.

75



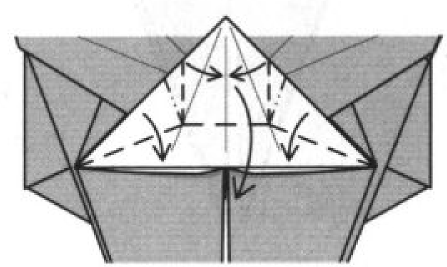
Fold and unfold.

76



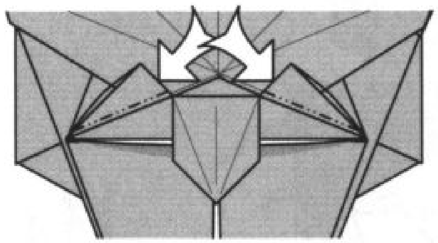
Fold and unfold.

77



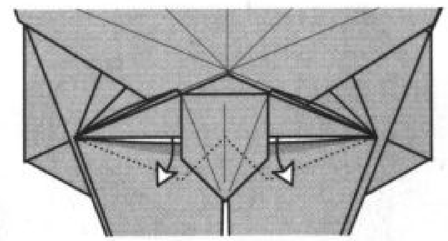
Fold two interlocking rabbit ear folds using the existing creases.

78



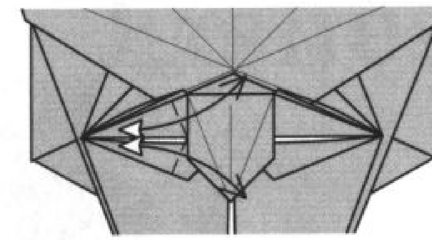
Reverse-fold
the two edges.

79



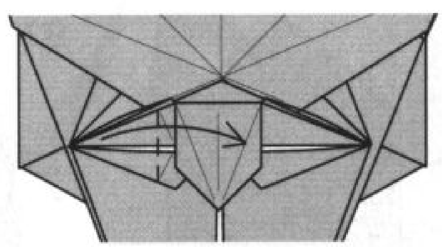
Pull out a single layer of
paper on each side.

80



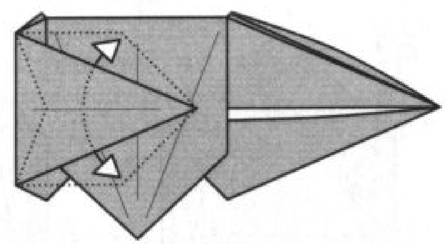
Fold and unfold.

81



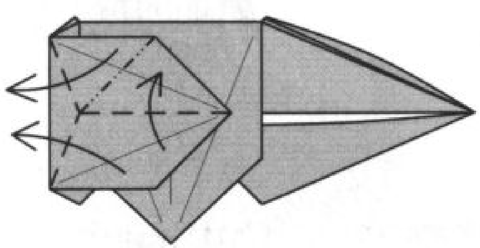
Fold over to the right.

82



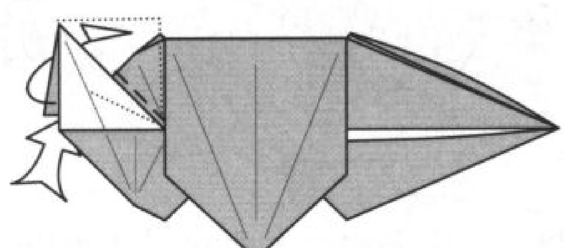
Enlarged view. Pull
out the loose paper.

83



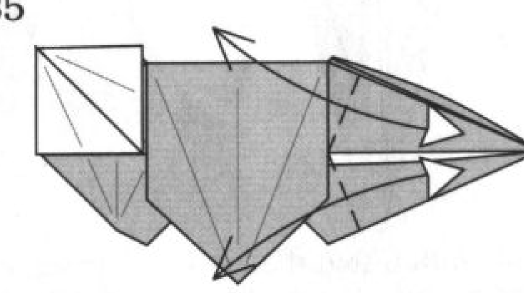
Fold a rabbit ear.

84



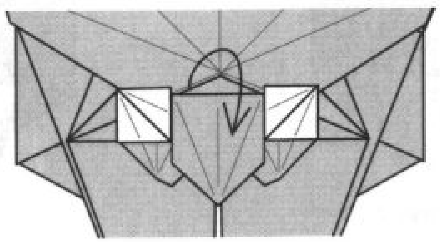
Reverse-fold.

85



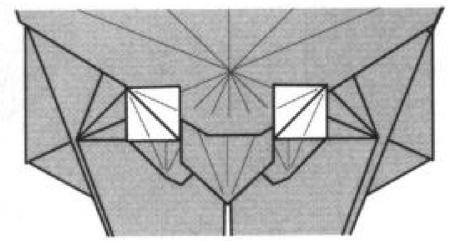
Repeat steps 80–84
on the right.

86



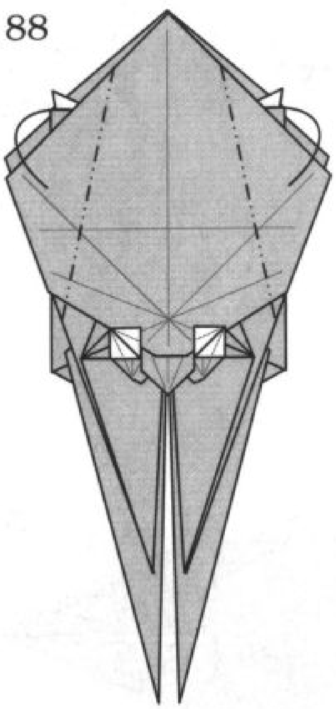
Bring the blunt point forward,
but keep it behind the white eyes.

87



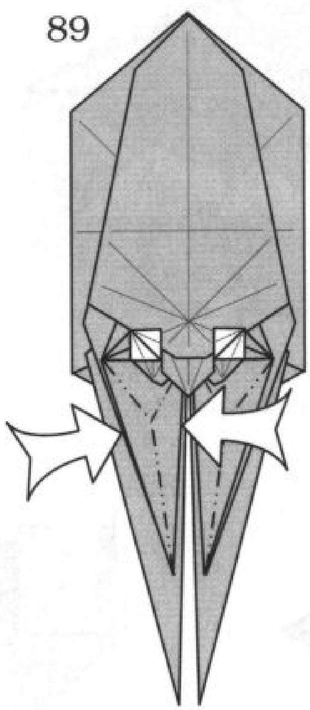
Like this.

88



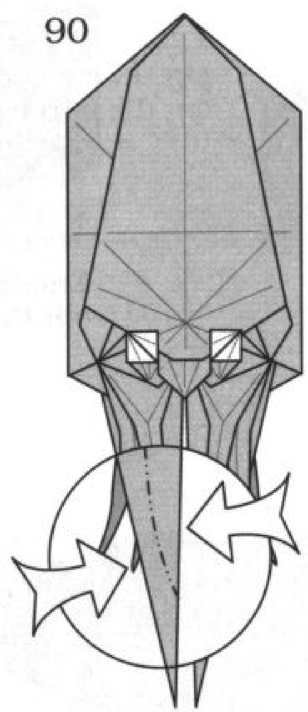
Mountain-fold the edges into the model; repeat behind.

89



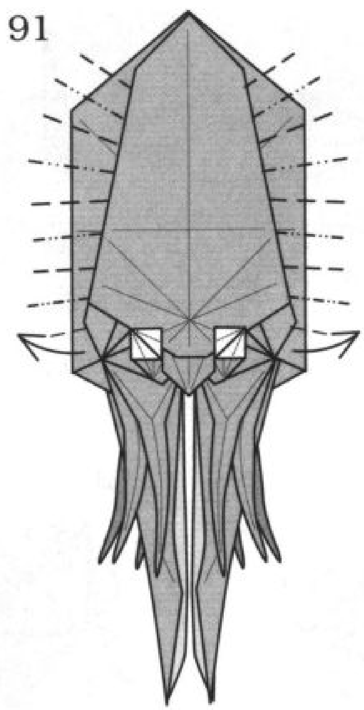
Pinch each of the eight short legs using rabbit ears.

90



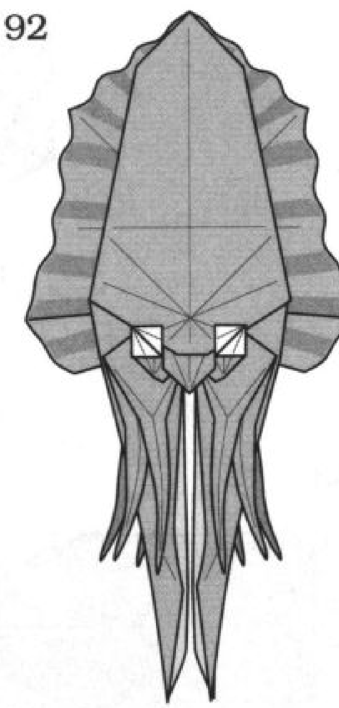
Flatten slightly the the two longer legs.

91



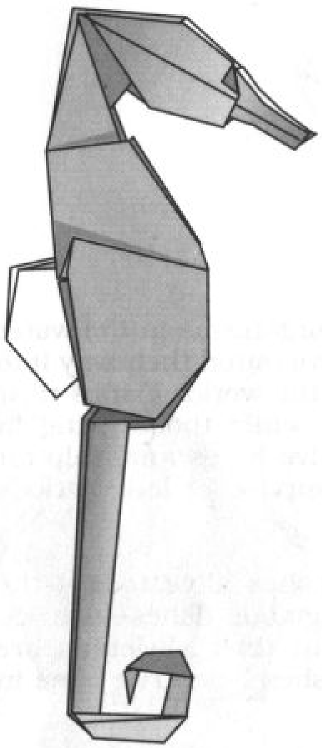
Pull the paper at the sides outward and upward a bit and curve it back and forth to make the edge ripple.

92

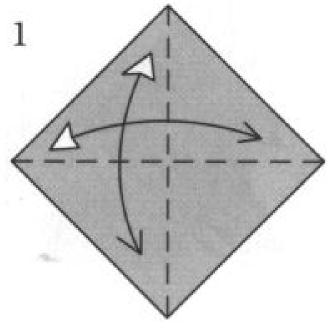


Cuttlefish

Seahorse

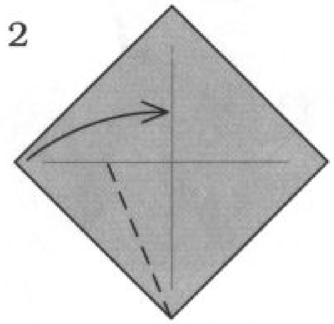


1



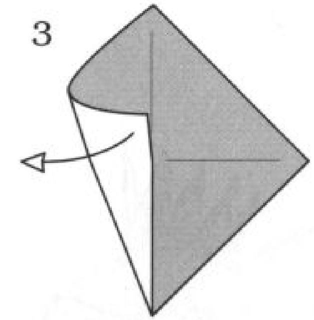
Fold and unfold along the diagonals.

2



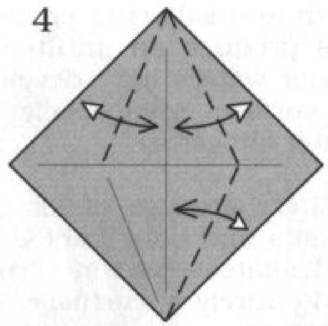
Kite-fold but only crease below the center line.

3



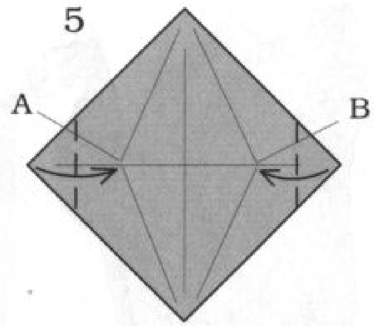
Unfold.

4



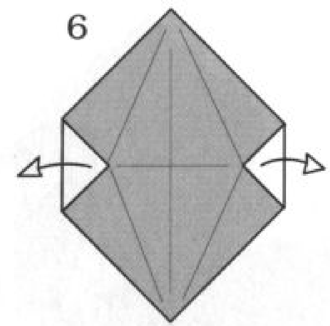
Fold and unfold three other sides.

5



Fold the corners to A and B.

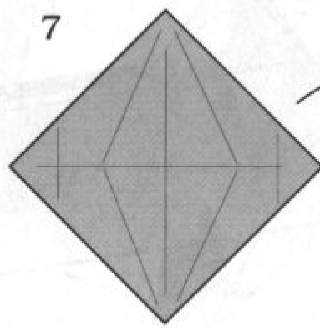
6



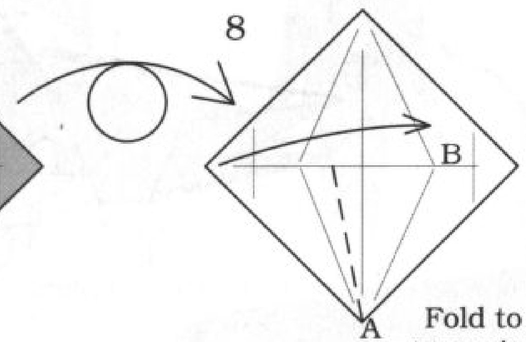
Unfold.

These small fish are mostly found in subtropical and tropical seas. They attach themselves to seaweed with their prehensile tails. Slowly and stiffly, they swim in an upright position. Their small scales form rings of hard protective covering around their bodies. Ranging in size from one and a half to twelve inches, seahorses (family *Hippocampus*) feed on small crustaceans and larvae.

7

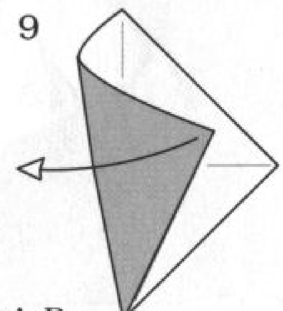


8

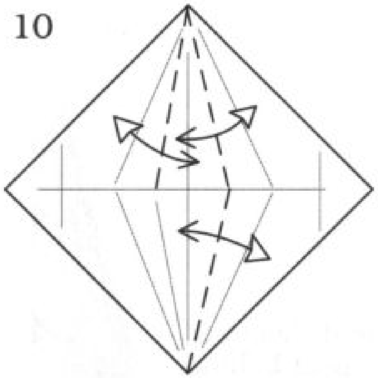


Fold to the line A–B, creasing only below the center line.

9

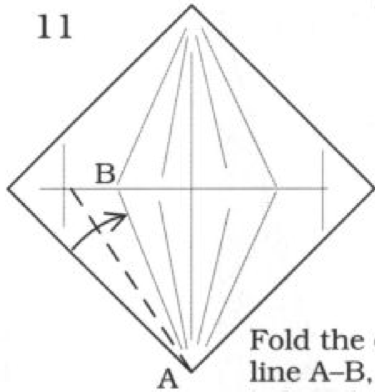


10



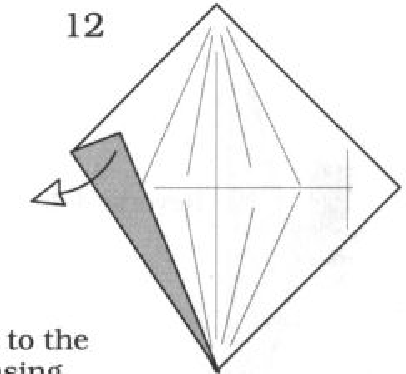
Fold and unfold.

11



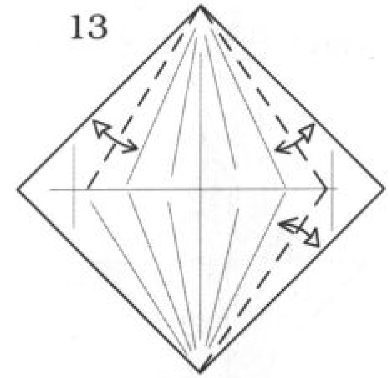
Fold the edge to the line A–B, creasing below the center line.

12



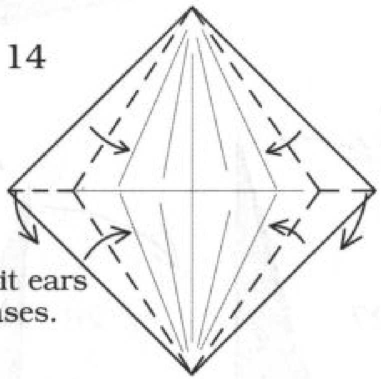
Unfold.

13



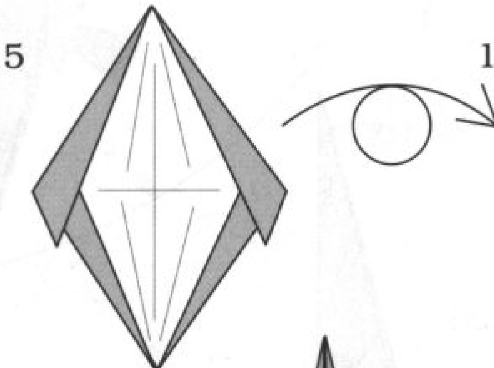
Fold and unfold.

14

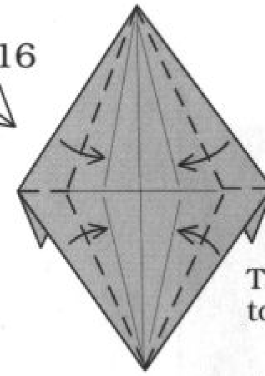


Fold two rabbit ears along the creases.

15

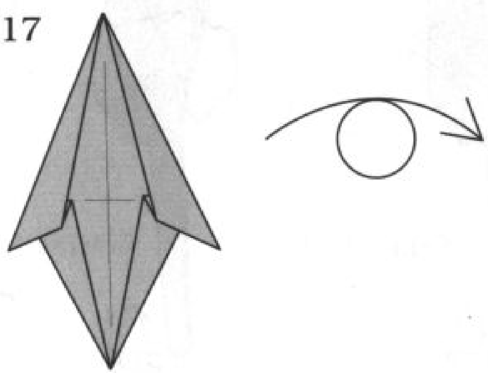


16

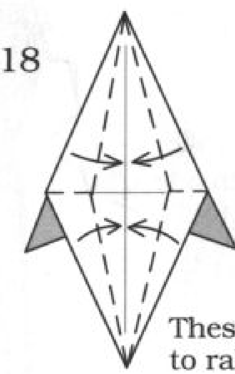


These are similar to rabbit ears.

17

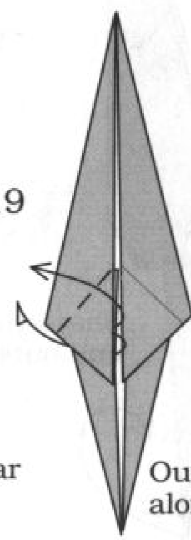


18



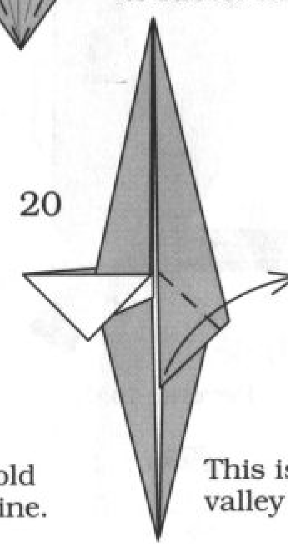
These are similar to rabbit ears.

19



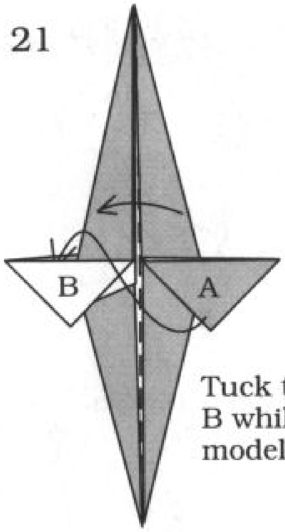
Outside-reverse-fold along the crease line.

20



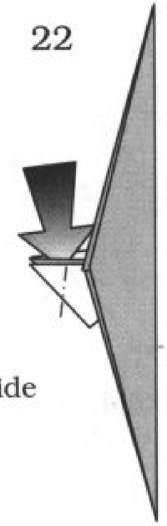
This is a simple valley fold.

21



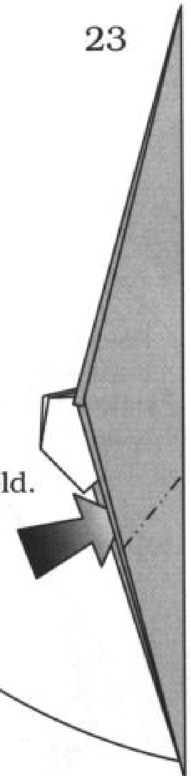
Tuck triangle A inside B while folding the model in half.

22



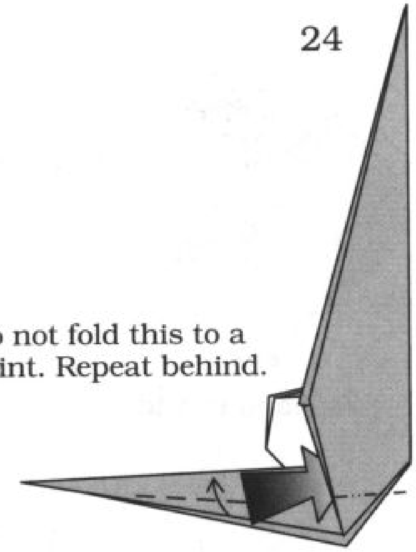
Reverse-fold.

23



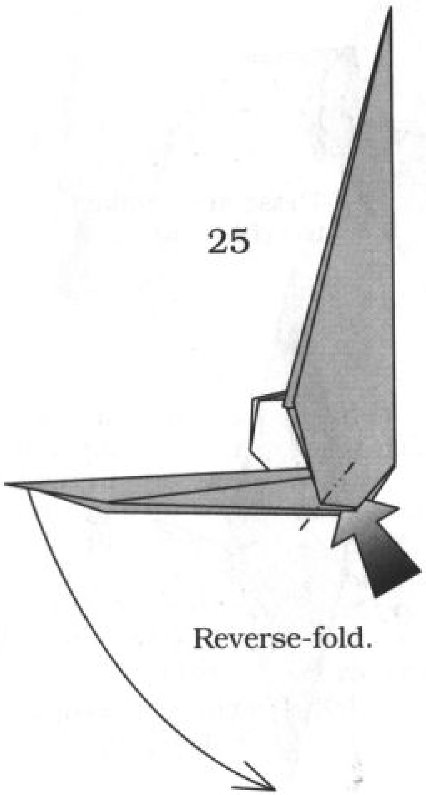
Reverse-fold.

24



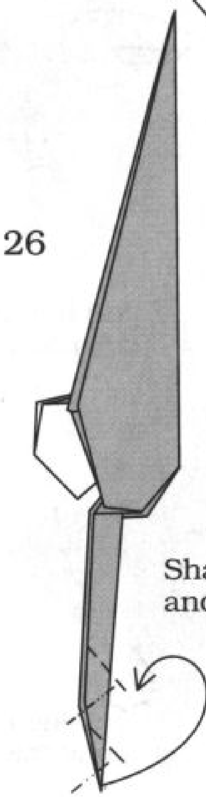
Do not fold this to a point. Repeat behind.

25



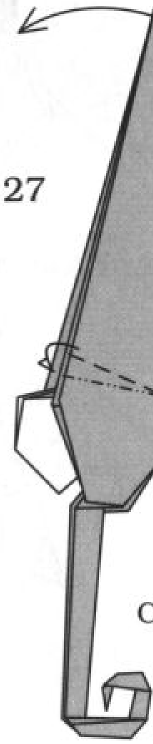
Reverse-fold.

26



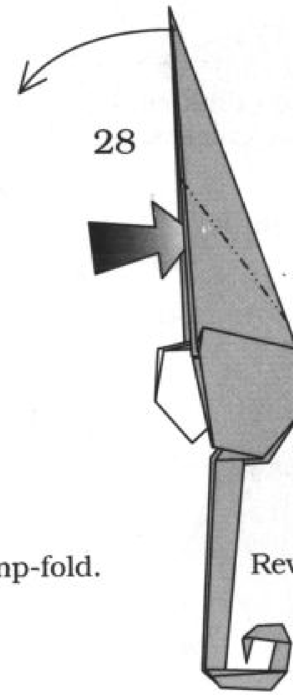
Shape the tail with inside and outside reverse folds.

27



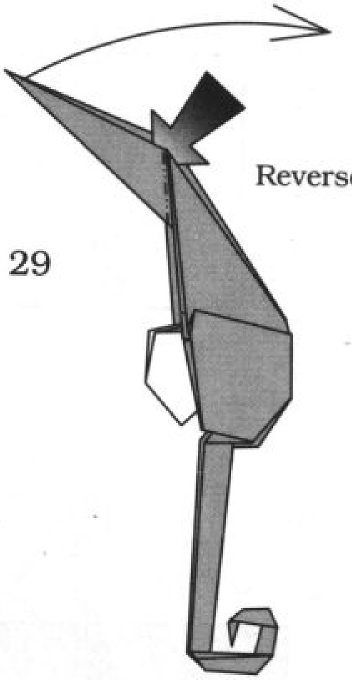
Crimp-fold.

28



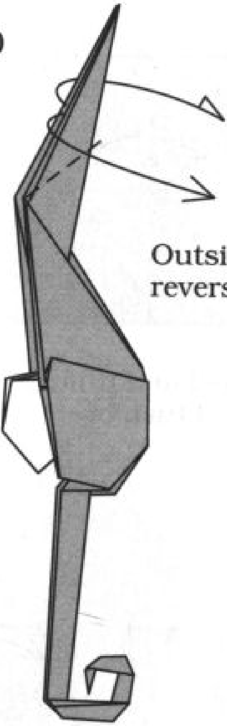
Reverse-fold.

29



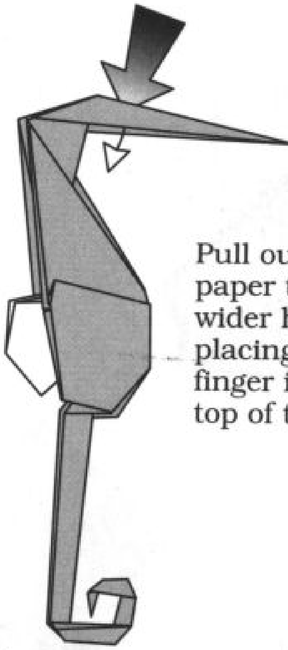
Reverse-fold.

30



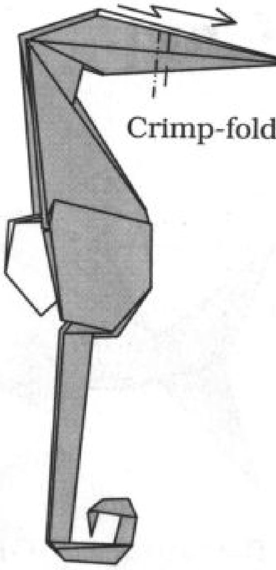
Outside-reverse-fold.

31



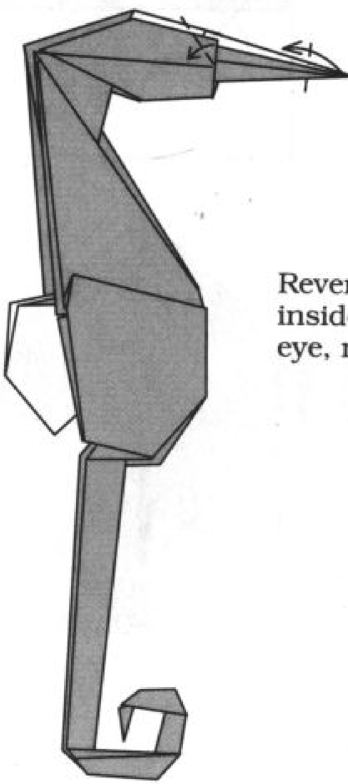
Pull out some paper to form a wider head by placing your finger into the top of the head.

32



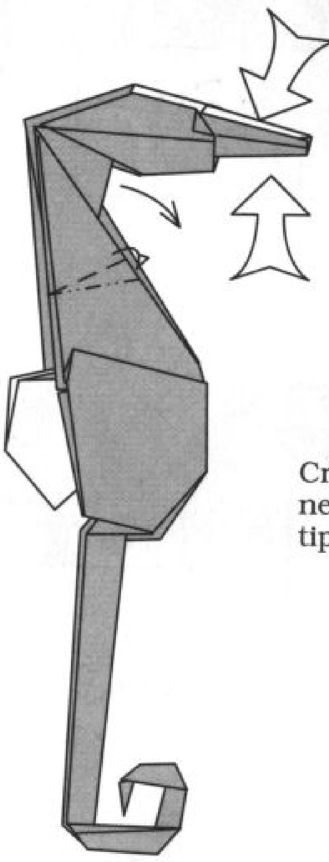
Crimp-fold.

33



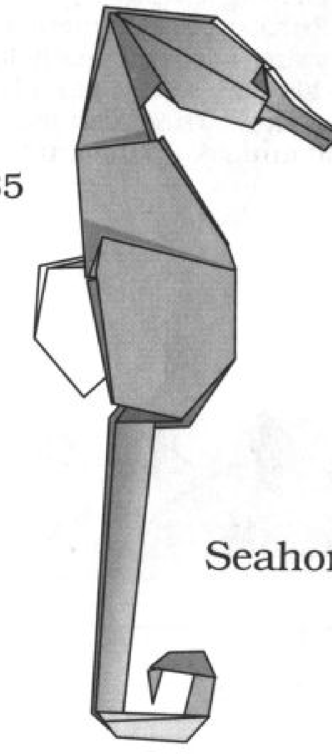
Reverse-fold the tip inside. Form the eye, repeat behind.

34



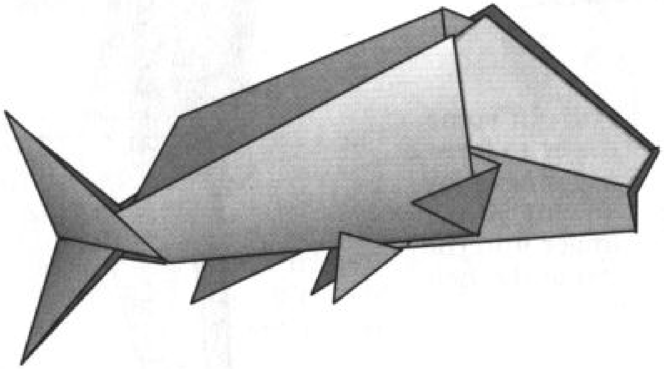
Crimp-fold the neck. Squeeze the tip of the head.

35



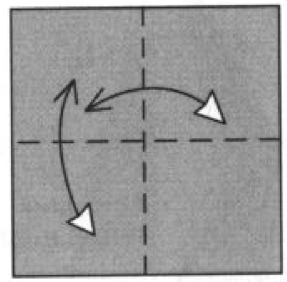
Seahorse

Carp

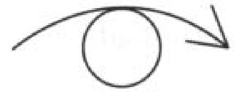


The carp or koi (*Cyprinos carpio*) has been genetically manipulated by the Japanese. These freshwater fish are found in Europe, North America, and Asia. They are most commonly found in ornamental pools and attain a length of two feet or more. These fish feed on tiny plants and animals in the mud.

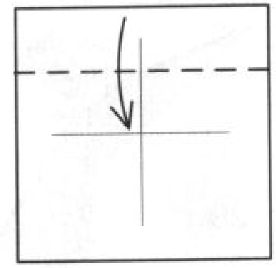
1



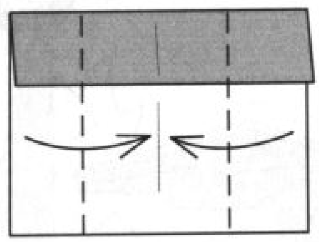
Fold and unfold and turn over.



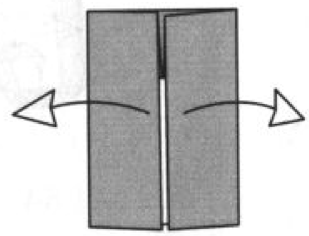
2



3

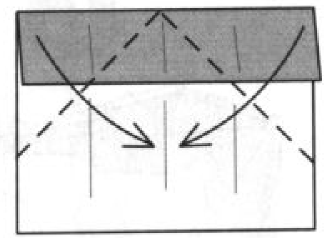


4

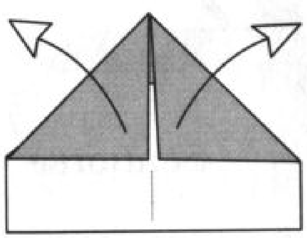


Unfold.

5

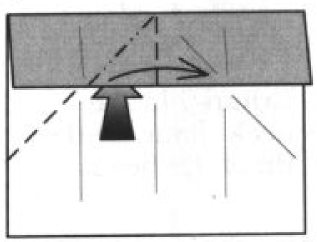


6



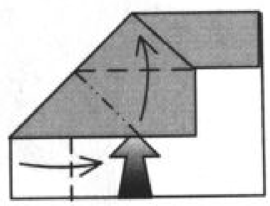
Unfold.

7



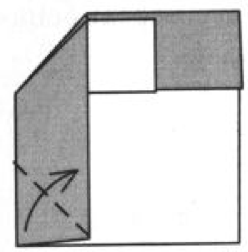
Squash-fold.

8

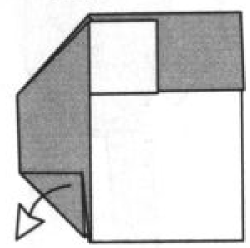


Squash-fold.

9

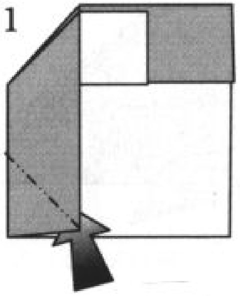


10



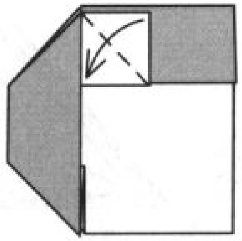
Unfold.

11

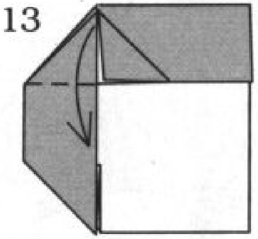


Reverse-fold.

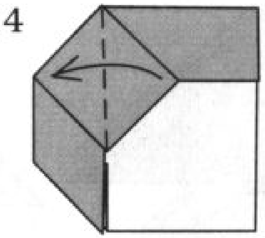
12



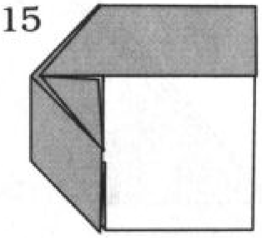
13



14

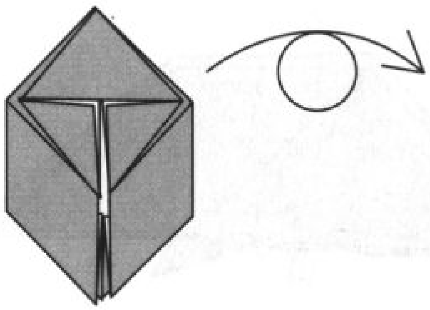


15

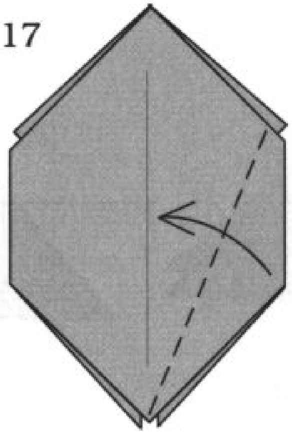


Repeat steps 7–14 on the right side.

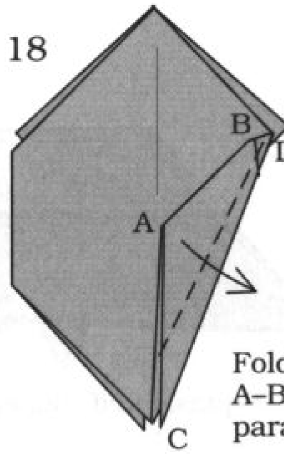
16



17

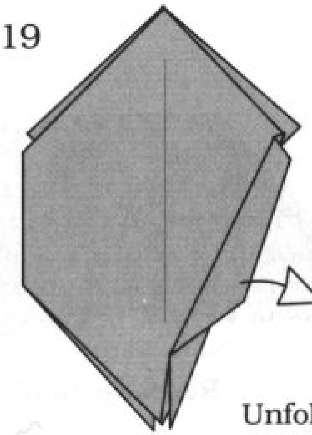


18



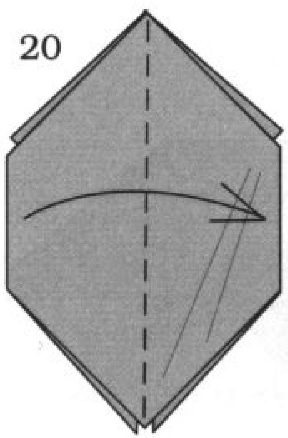
Fold so that line A–B is about parallel to line C–D.

19

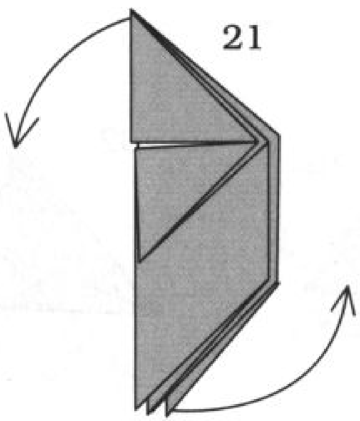


Unfold.

20

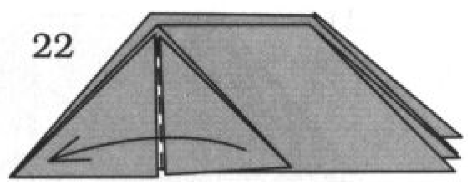


21



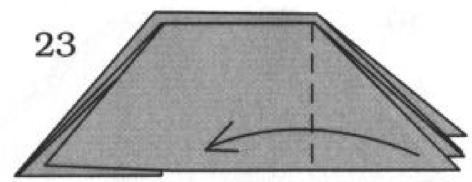
Rotate the model.

22



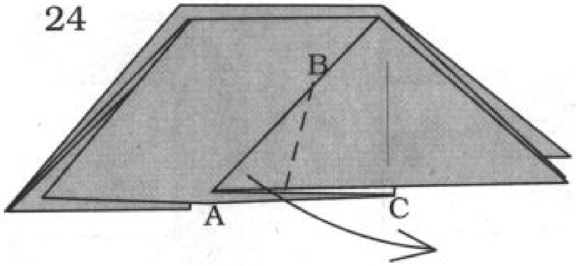
Do not repeat behind.

23



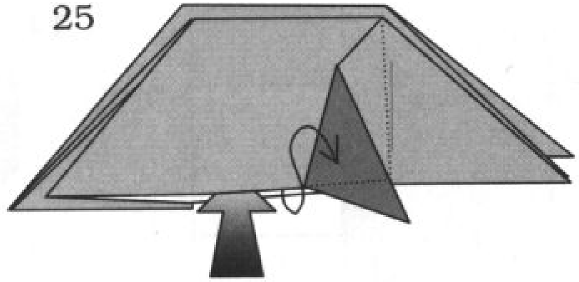
Do not repeat behind.

24



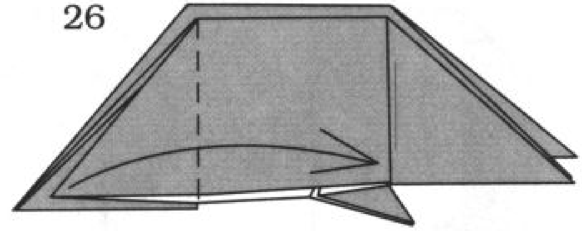
Fold so that some point between line A–B touches point C.

25

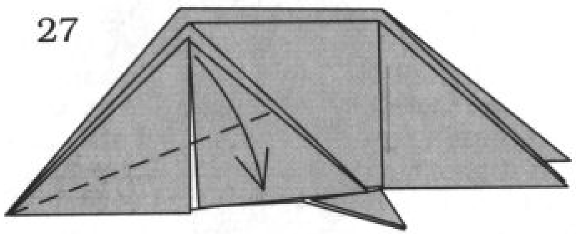


Place the paper above the darker region.

26

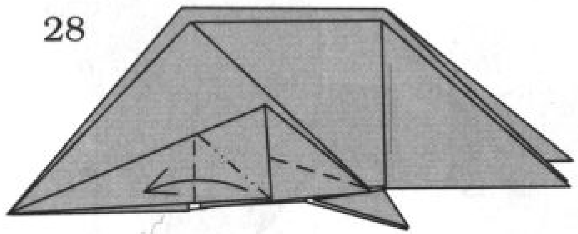


27



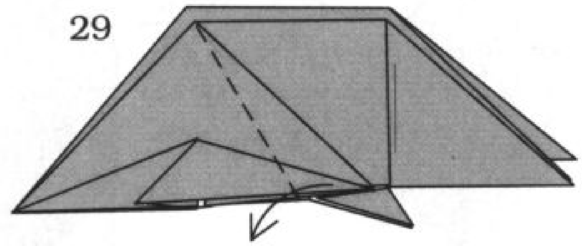
Repeat behind.

28



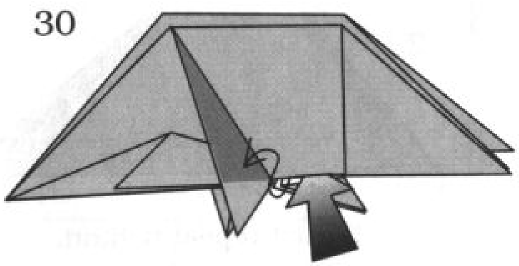
Squash-fold. Repeat behind.

29



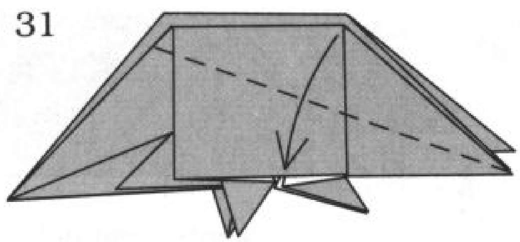
Repeat behind.

30

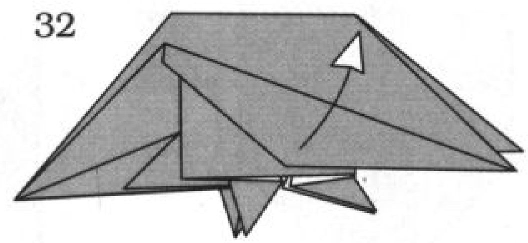


Place some paper over the darker area. Repeat behind.

31

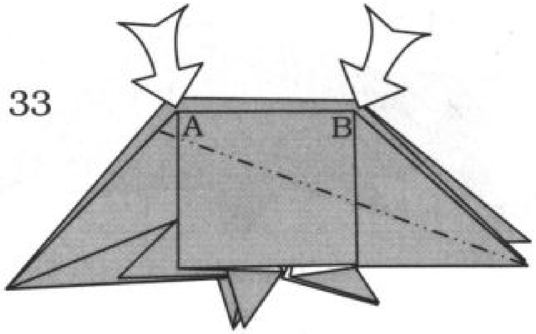


32



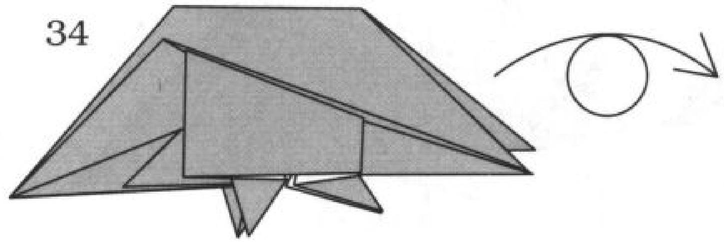
Unfold.

33

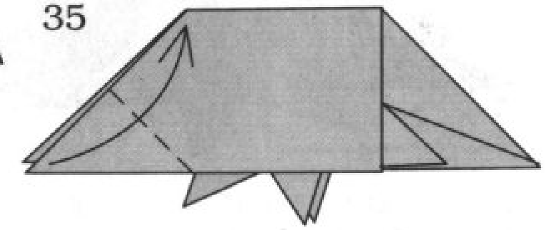


Sink. Push in corners A and B but do not unfold them.

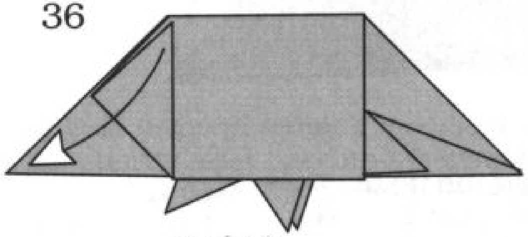
34



35

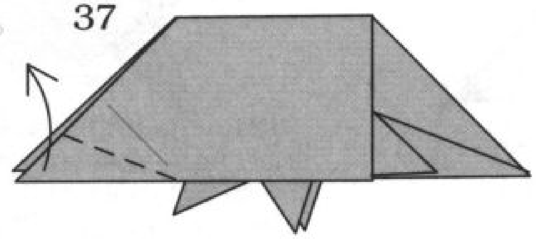


36

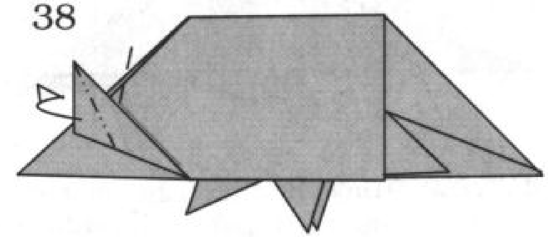


Unfold.

37

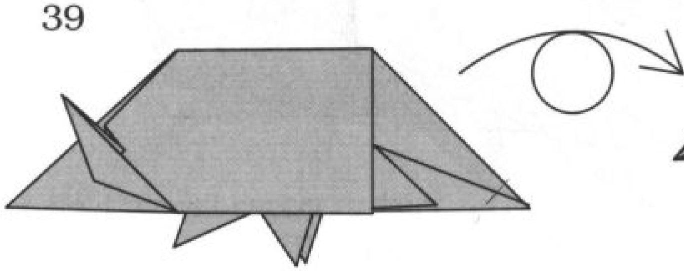


38

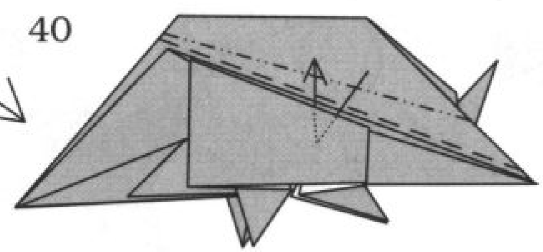


Reverse-fold.

39

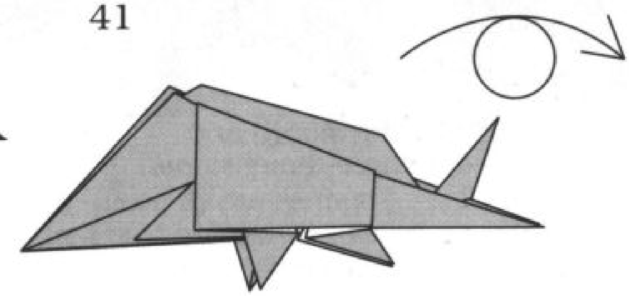


40

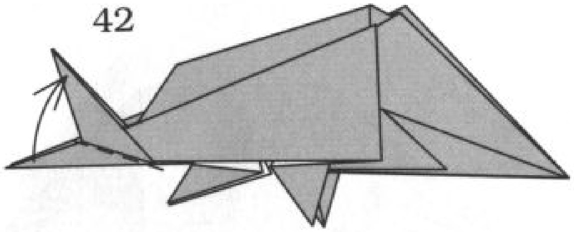


Tuck inside while folding on the existing creases.

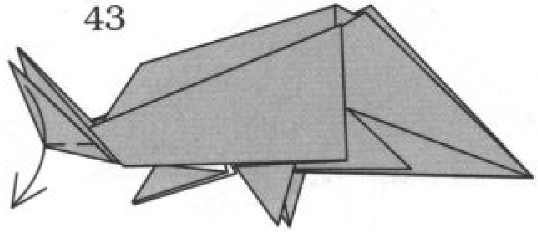
41



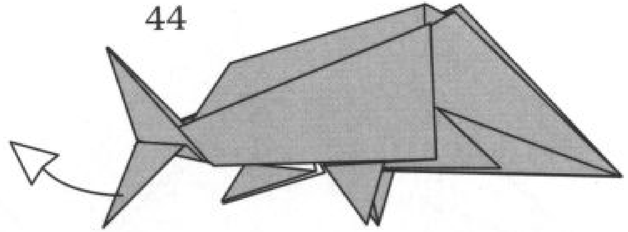
42



43

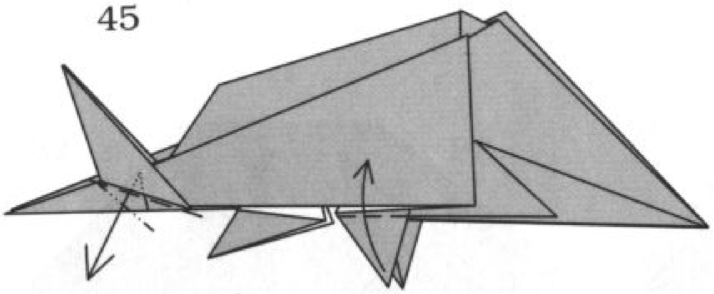


44



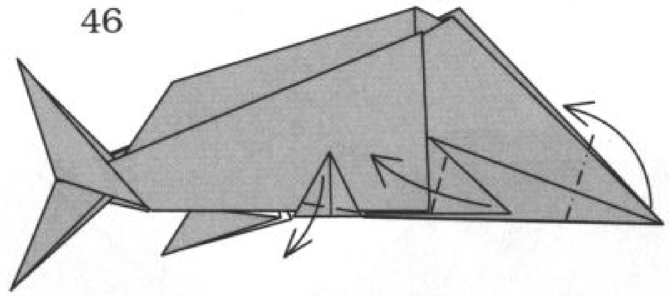
Unfold.

45



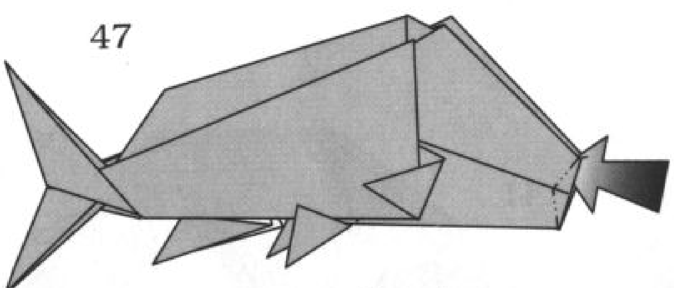
Tuck the tip of the base of the tail inside. Repeat behind for the fin.

46



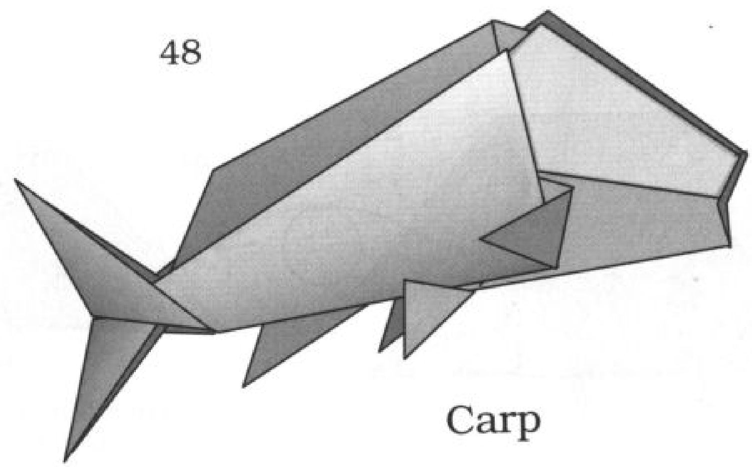
Reverse-fold the tip of the head. Repeat behind to form the other fins.

47



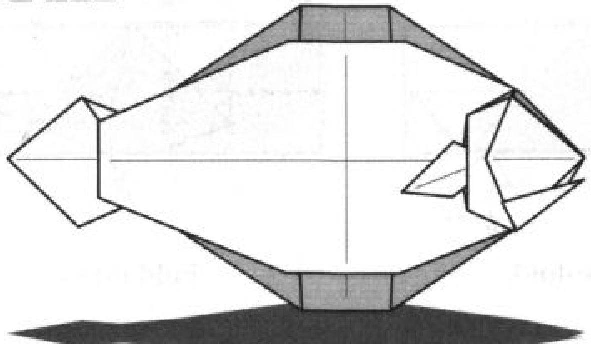
Make the mouth and body three-dimensional.

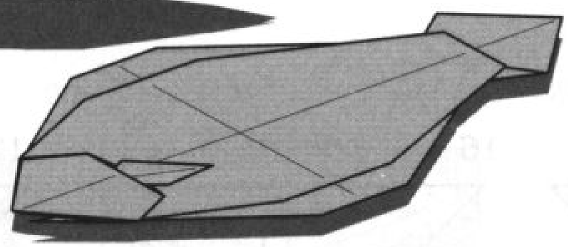
48



Carp

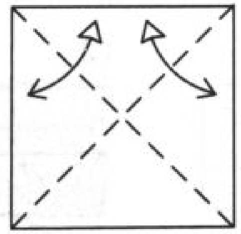
Brill





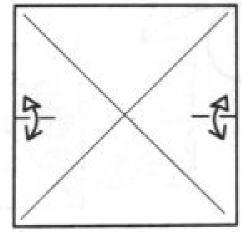
The Brill (*Scophthalamus rhombus*) is a variety of flatfish, a fish who, shortly after hatching, begins to lean to one side—the right side, in this case. As it leans, the right eye migrates to the upper side of the body, which assumes a dark coloration, and the fish eventually lies on the ocean's sandy bottom, its lighter side down. There are two groups of flatfishes—left-eyed and right-eyed—and by folding this model backwards, you can change this model to a fish of the opposite handedness.

1



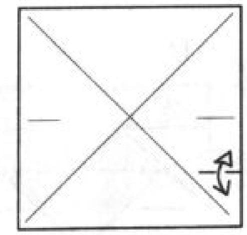
Crease the diagonals.

2



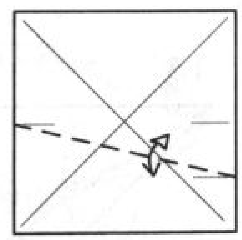
Make pinch marks halfway down the sides.

3



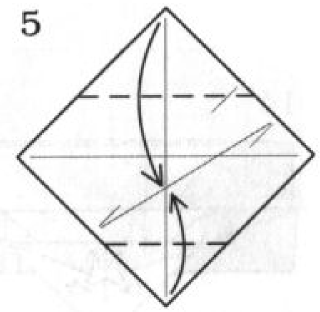
Bring the bottom right corner to the crease, pinch, and unfold.

4



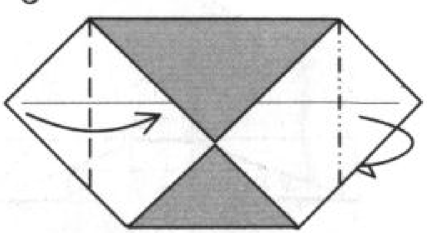
Connect the two pinch marks with a crease. Rotate the paper 1/8 turn counterclockwise.

5



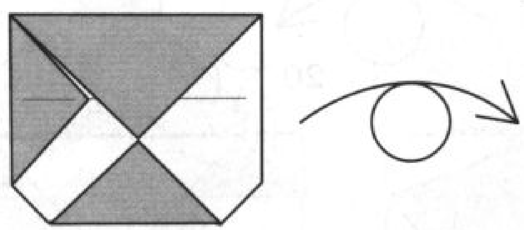
Fold the top and bottom corners to meet at the point where the crease crosses the diagonal.

6



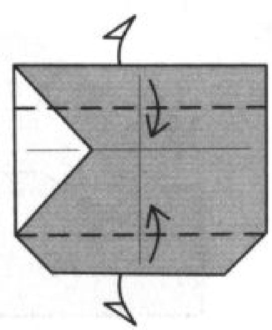
Fold the left corner in front and the right corner behind.

7



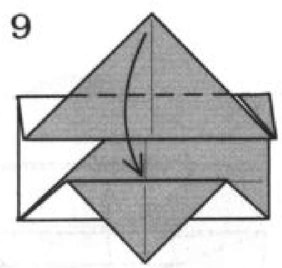
Turn the paper over.

8



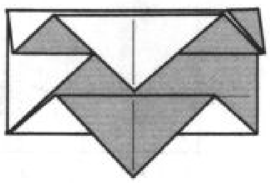
Fold the top edge down to the center line, allowing the point behind to flip up. Fold the bottom up similarly.

9



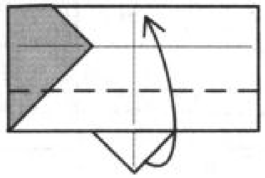
Fold down.

10



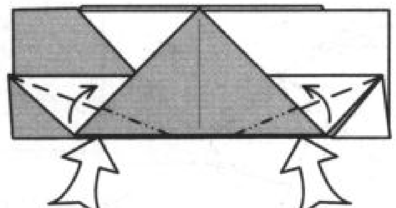
Turn the paper over.

11



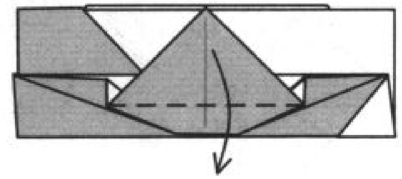
Fold the bottom edge upward.

12



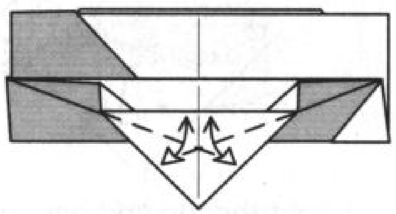
Reverse-fold.

13



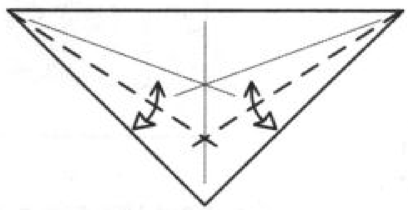
Fold down.

14



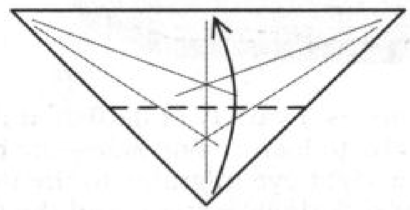
Crease the angle bisectors.

15



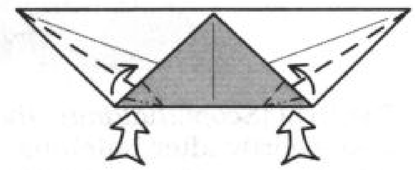
Enlarged view. Crease the angle bisectors.

16



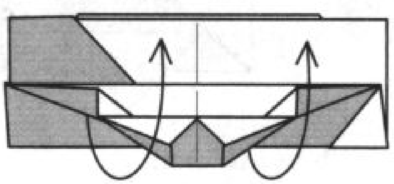
Fold the point up to the top edge.

17



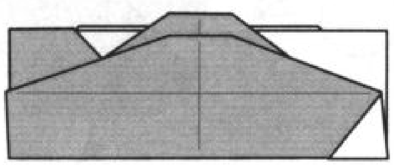
Valley-fold the edges and squash-fold the corners.

18



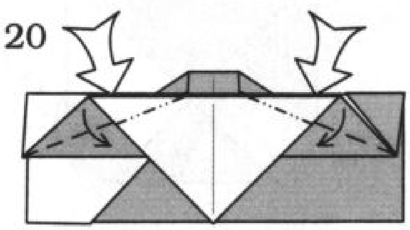
Fold the entire assembly upward.

19



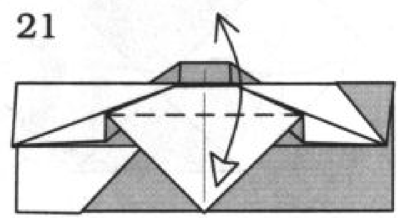
Turn the paper over.

20



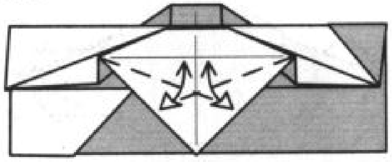
Reverse-fold the corners.

21



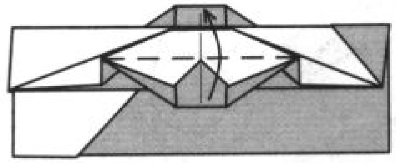
Fold and unfold.

22



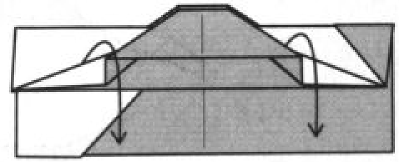
Repeat steps 14-17
on this flap.

23



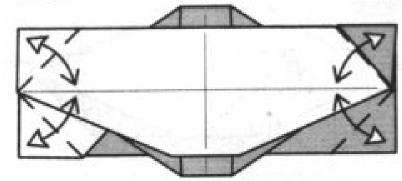
Fold upward.

24



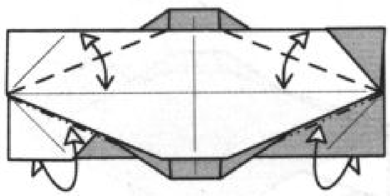
Fold the entire
assembly downward.

25



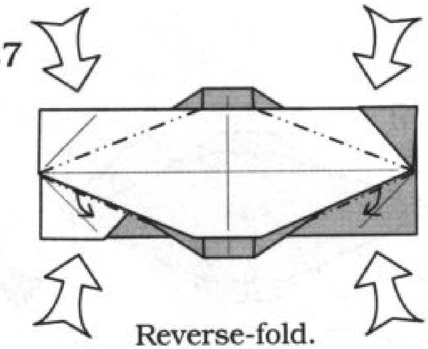
Fold and unfold.

26



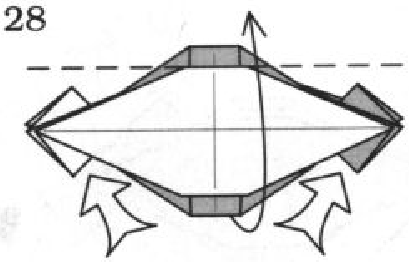
Fold and unfold.

27



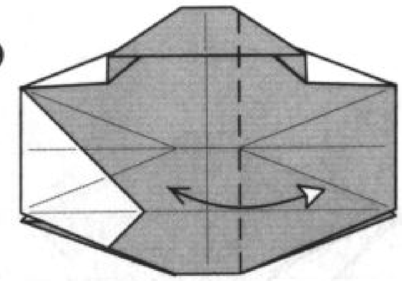
Reverse-fold.

28



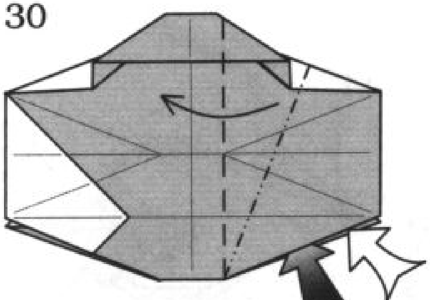
Lift up the top layers.

29



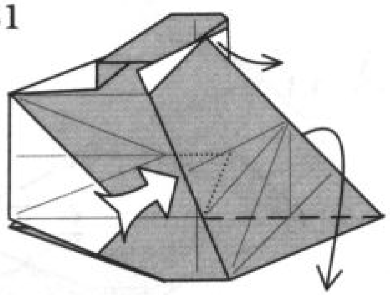
Fold and unfold.

30



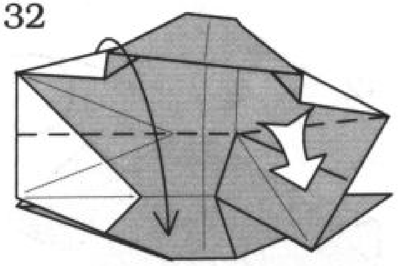
Squash-fold the top layers.

31



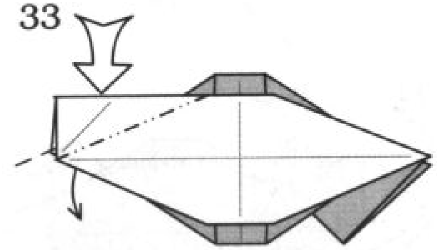
Swing the right side down,
incorporating a hidden crimp.
The model will not lie flat.

32



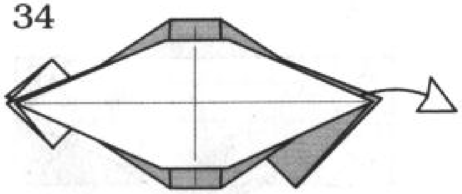
Close the model up
and flatten it.

33



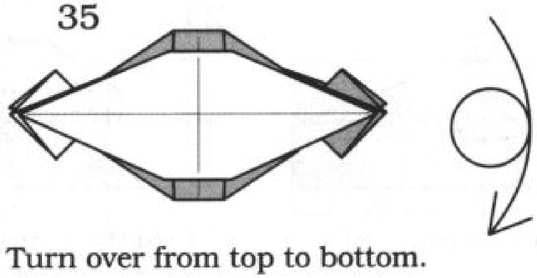
Reverse-fold (again).

34



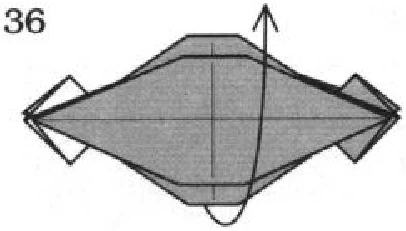
Undo steps 28-33.

35



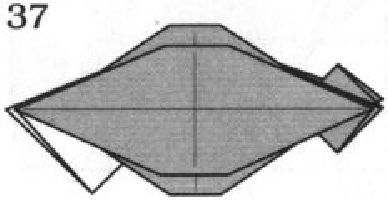
Turn over from top to bottom.

36



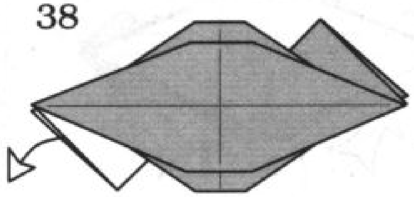
Repeat steps 28–33 on the left.

37



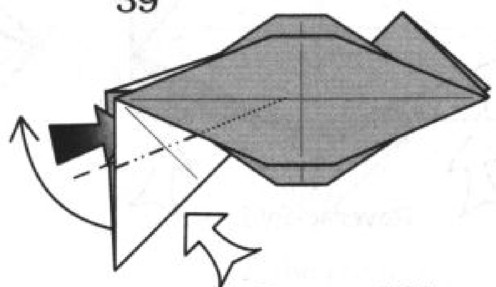
Refold the right side to step 34.

38



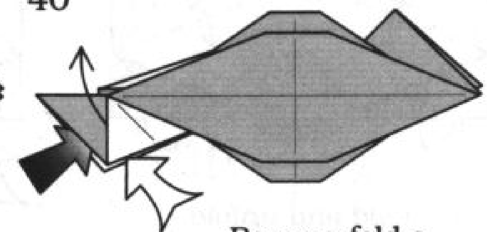
Pull out the trapped paper.

39



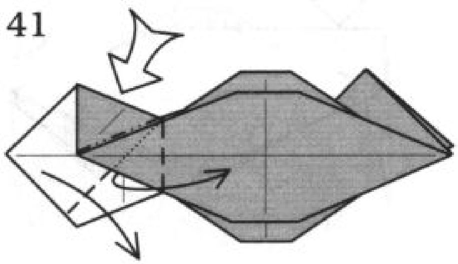
Reverse-fold.

40



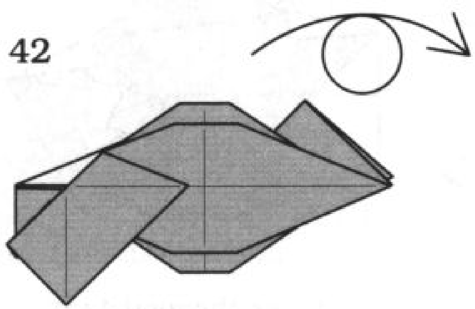
Reverse-fold a single layer upward.

41



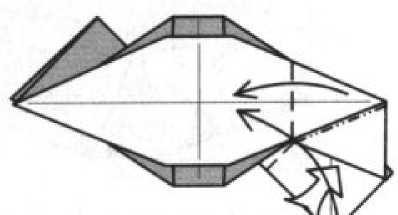
Squash-fold asymmetrically.

42



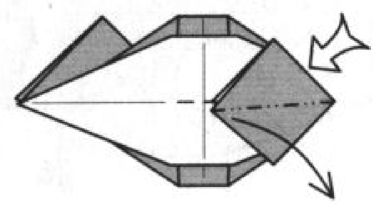
Turn the model over.

43



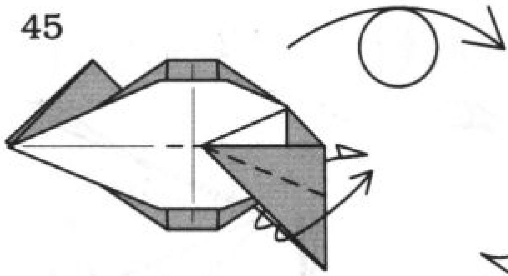
Squash-fold.

44



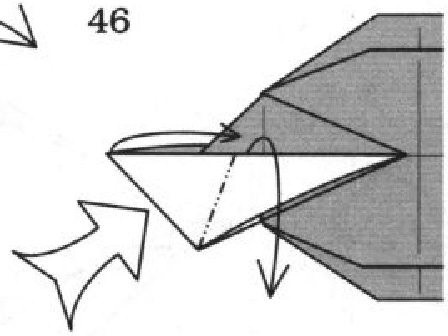
Squash-fold.

45



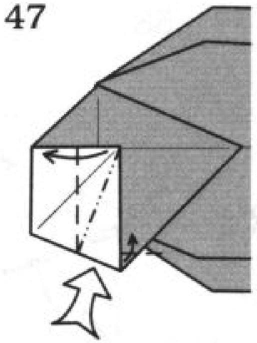
Outside-reverse-fold.

46



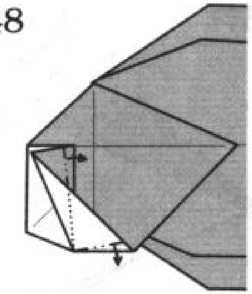
Enlarged view. Squash-fold.

47



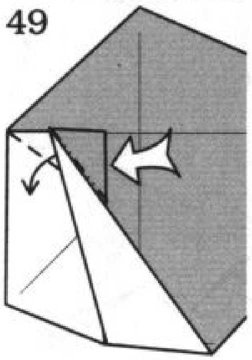
Swivel-fold.

48



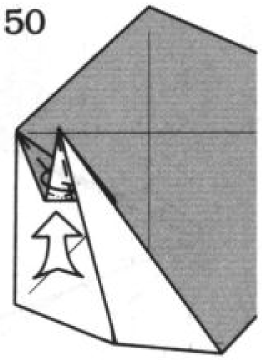
Shift the swivel fold slightly to the right.

49



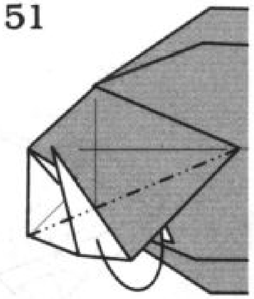
Enlarged view.
Reverse-fold.

50



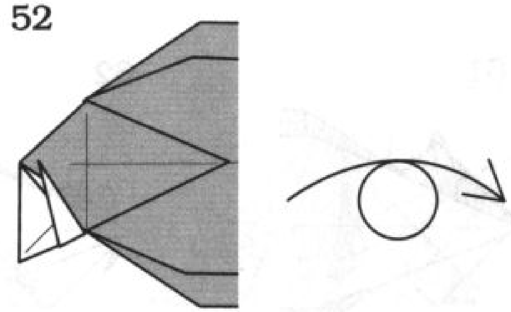
Swivel-fold and tuck inside the pocket.

51



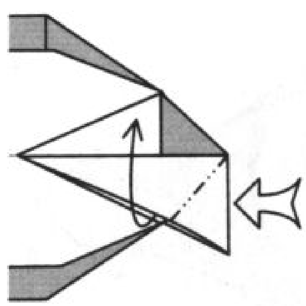
Mountain-fold the flap into the pocket behind.

52



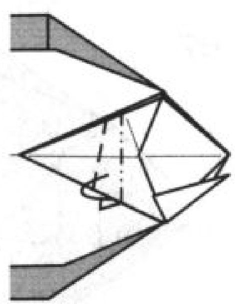
Like this. Turn the model over.

53



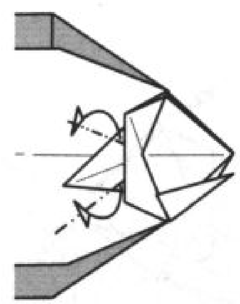
Squash-fold.

54



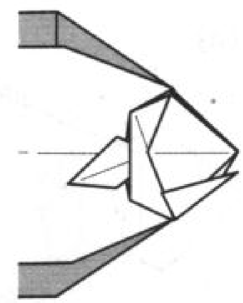
Crimp. Repeat behind.

55



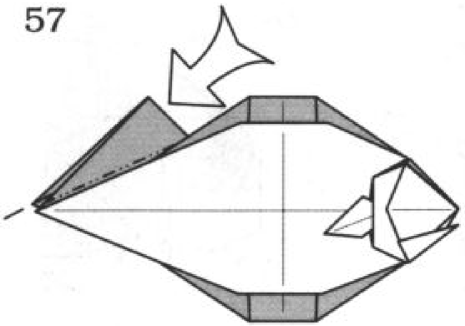
Shape the fin.
Repeat behind.

56



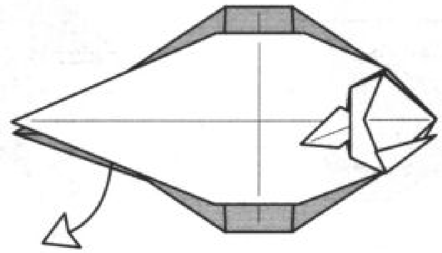
Like this.

57



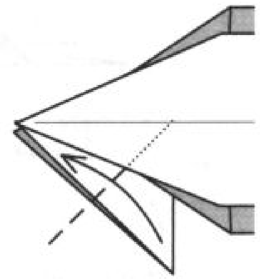
Reverse-fold.

58



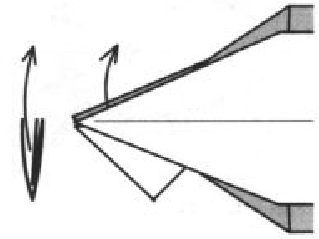
Pull out the trapped corner.

59



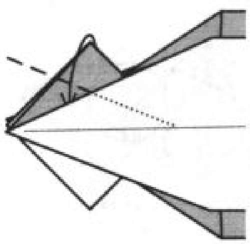
Valley-fold.

60



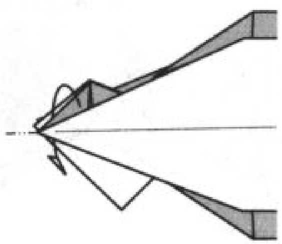
Fold one pair of layers up from the inside.

61



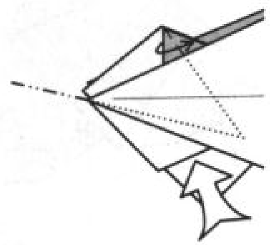
Valley-fold.

62



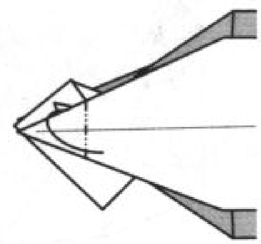
Fold this layer down.

63



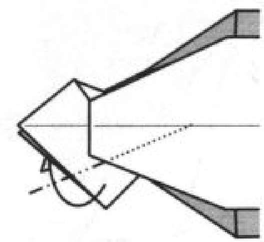
Enlarged view of tail. Reverse-fold the edge.

64



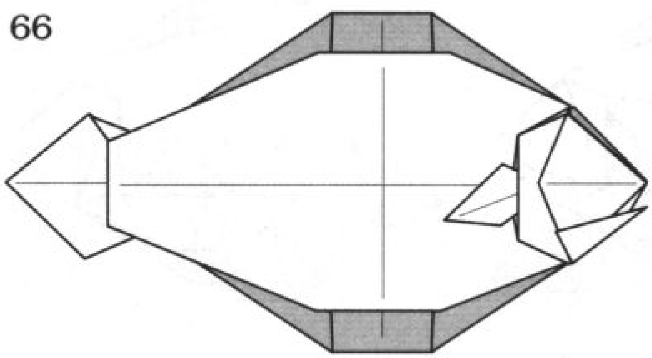
Mountain-fold the point into the pocket.

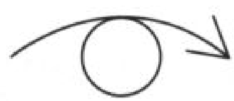
65



Repeat steps 61–64 on the bottom of the other side.

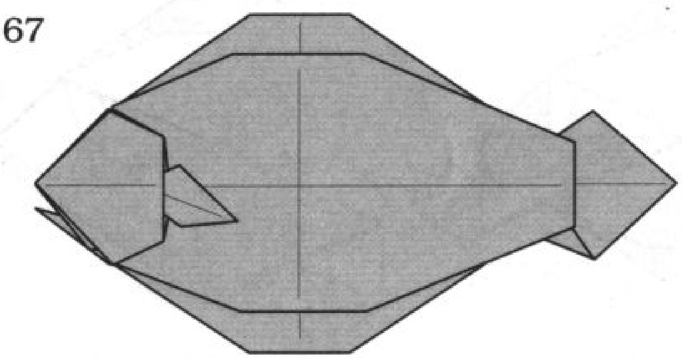
66





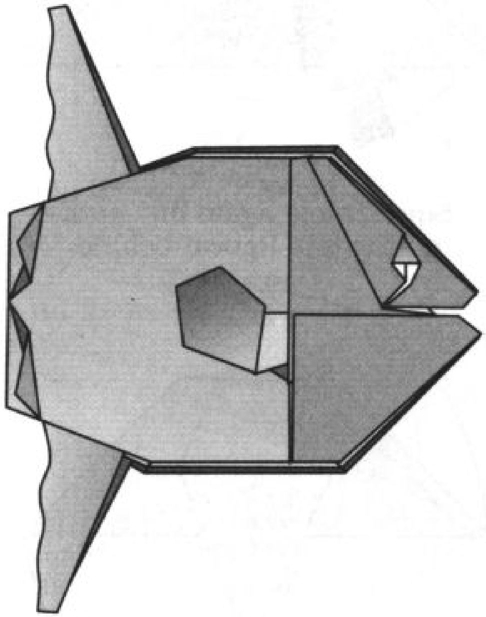
Turn the model over.

67



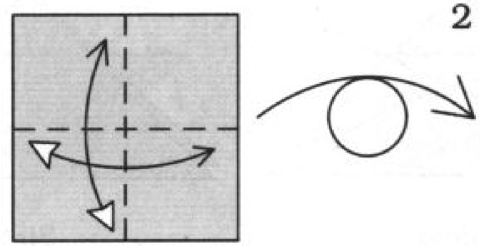
Brill

Ocean Sunfish



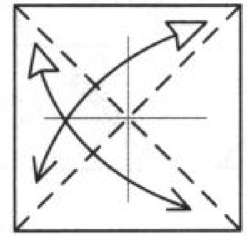
Ocean sunfishes (*Mola molas*) live in the open seas in temperate and tropical areas. They can grow to 13 feet and weigh 600 pounds. The young swim in a vertical position while adults often swim on their side. They feed on plankton, fish, and crustaceans.

1



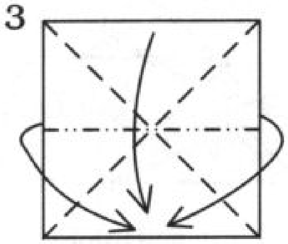
Fold and unfold.

2



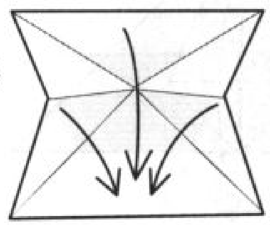
Fold and unfold.

3



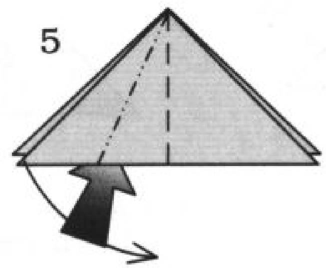
Collapse along the creases.

4



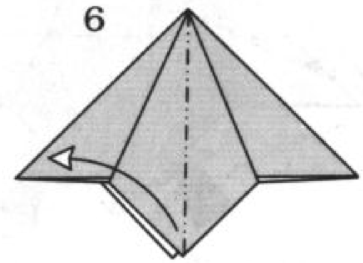
A three-dimensional intermediate step.

5



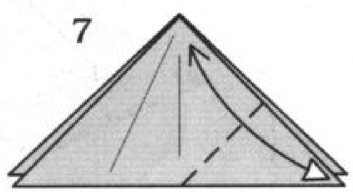
Squash-fold, repeat behind.

6



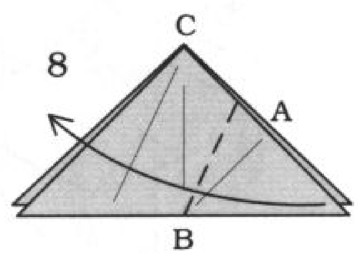
Unfold, repeat behind.

7



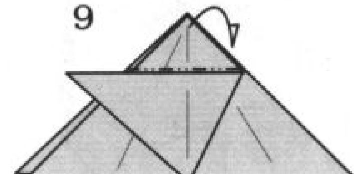
Fold up and unfold.

8

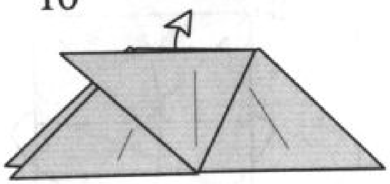


Fold so that A lies along line B–C.

9

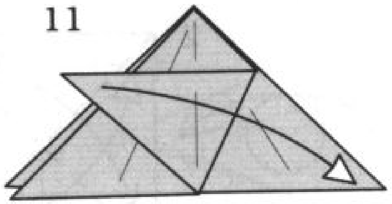


10



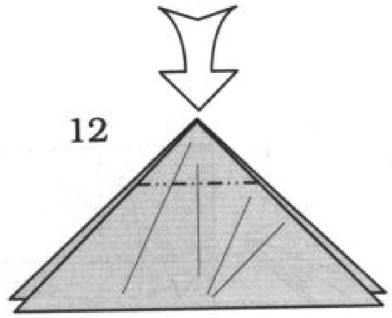
Unfold.

11



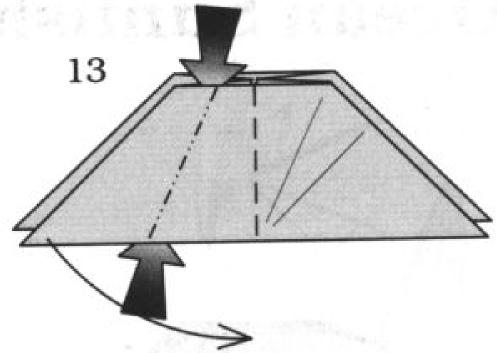
Unfold.

12



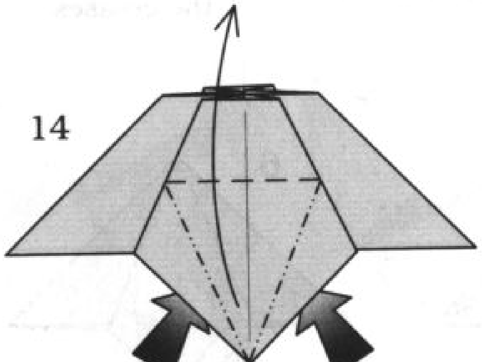
Sink.

13



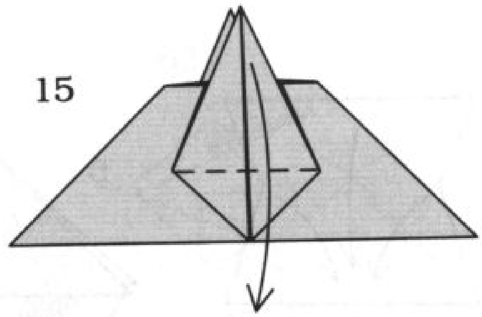
Squash-fold again but work out the top. Repeat behind.

14



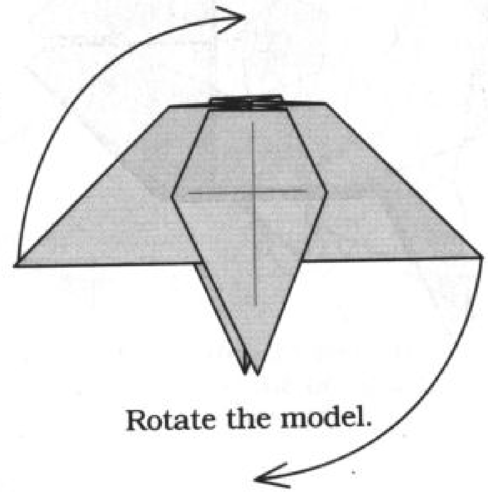
Petal-fold. Repeat behind.

15



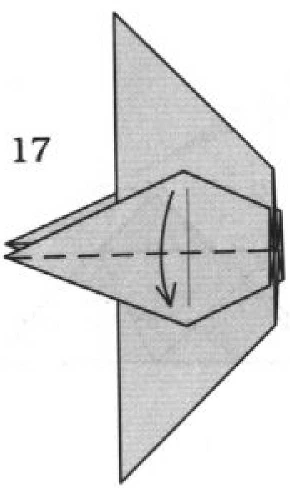
Repeat behind.

16

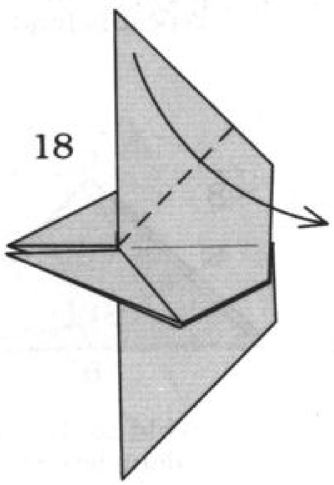


Rotate the model.

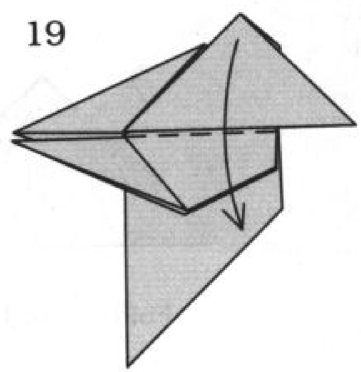
17



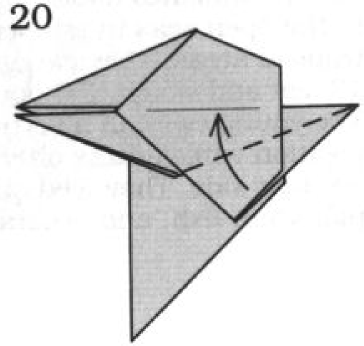
18



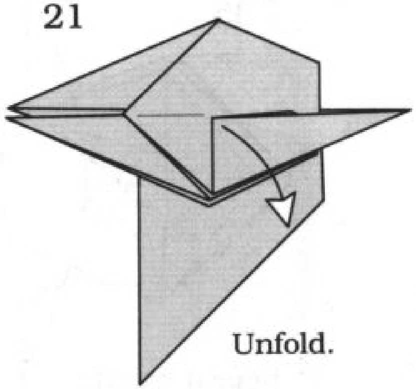
19



20

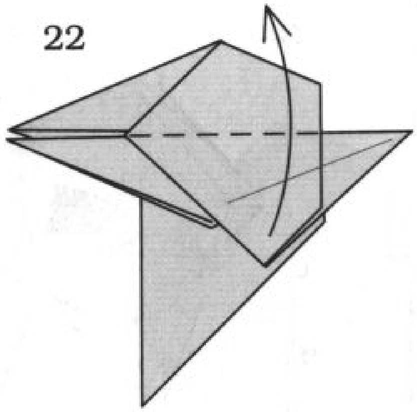


21

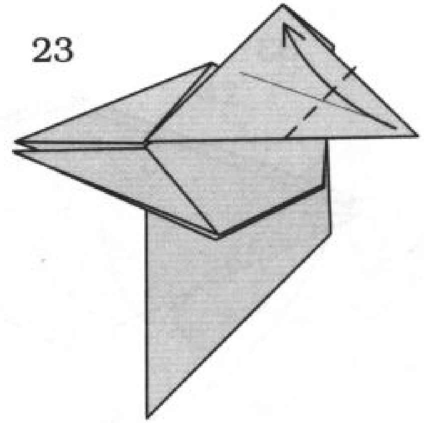


Unfold.

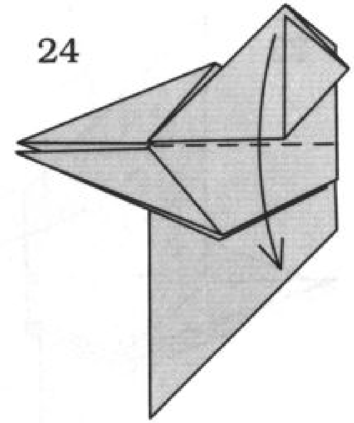
22



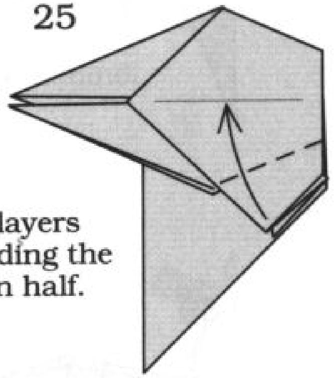
23



24

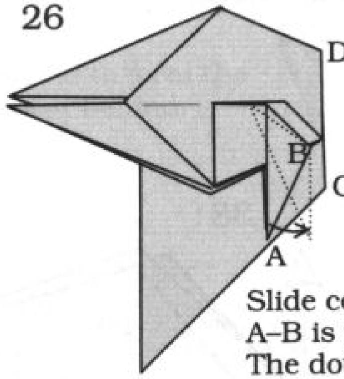


25



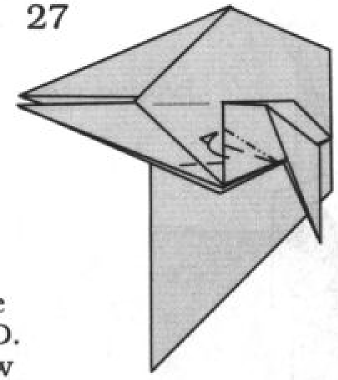
Lift the top layers up while folding the hidden fin in half.

26

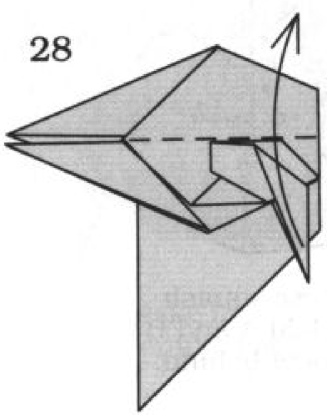


Slide corner A so line A–B is parallel to C–D. The dotted lines show where it will be folded.

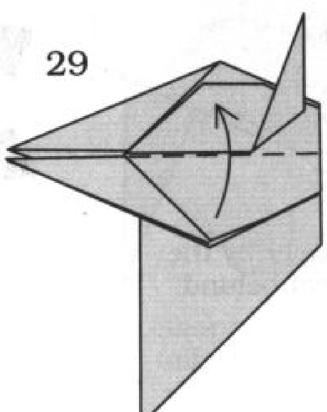
27



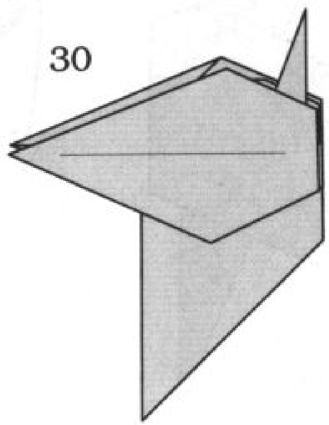
28



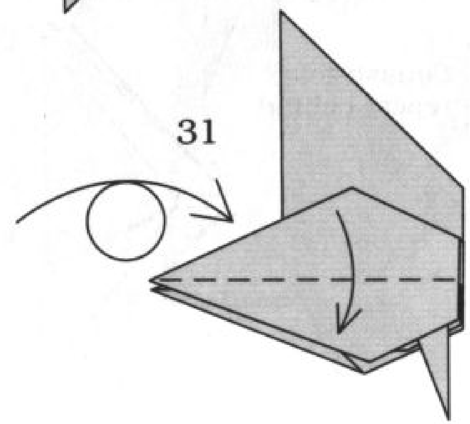
29



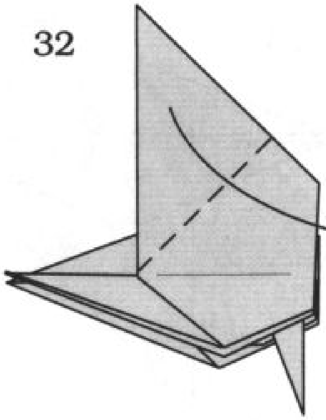
30



31

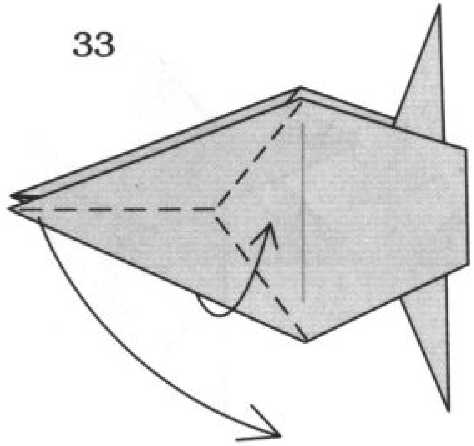


32



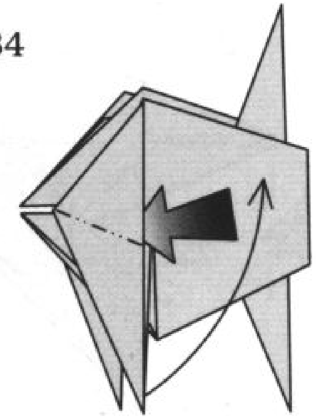
Continue by repeating steps 18–30.

33



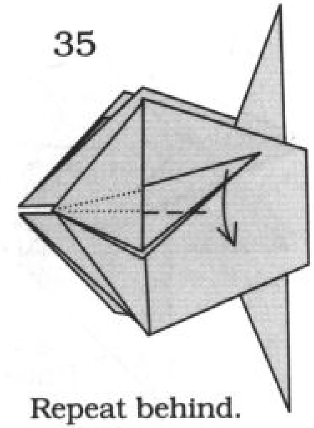
Rabbit-ear, repeat behind.

34



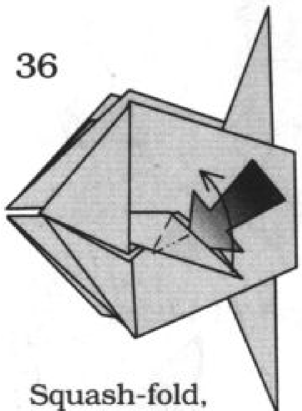
Reverse-fold, repeat behind.

35



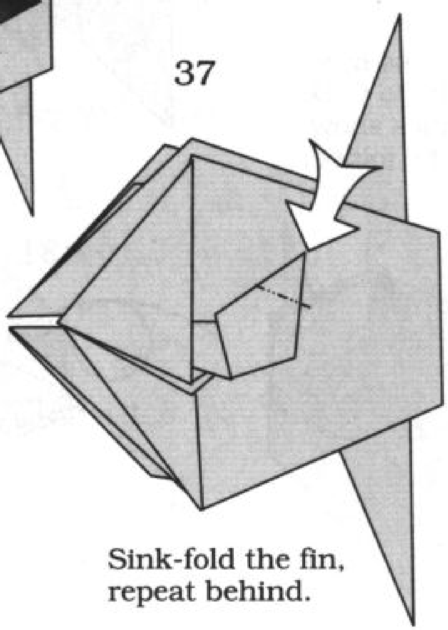
Repeat behind.

36



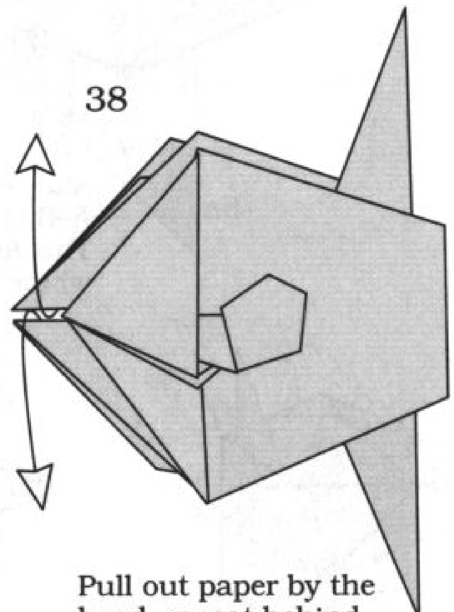
Squash-fold, repeat behind.

37



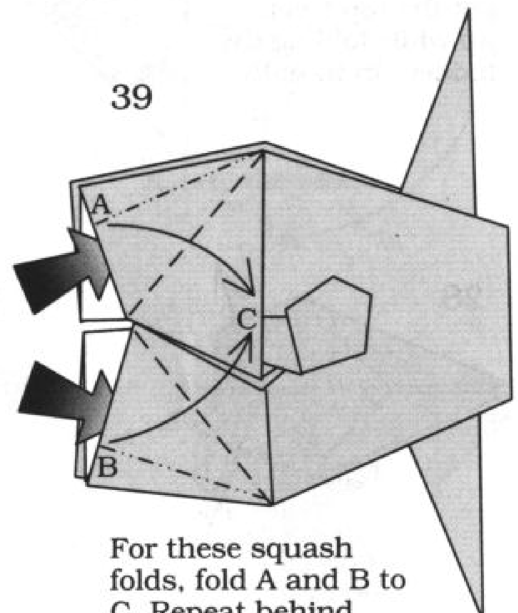
Sink-fold the fin, repeat behind.

38



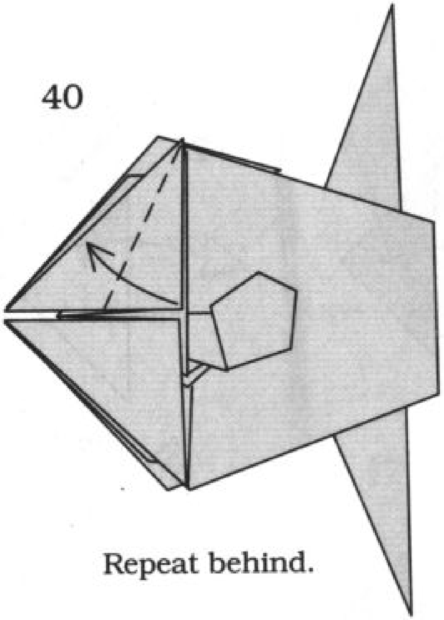
Pull out paper by the head, repeat behind.

39



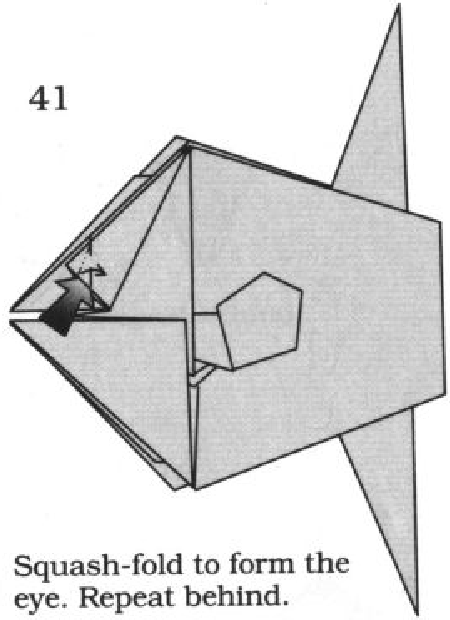
For these squash folds, fold A and B to C. Repeat behind.

40



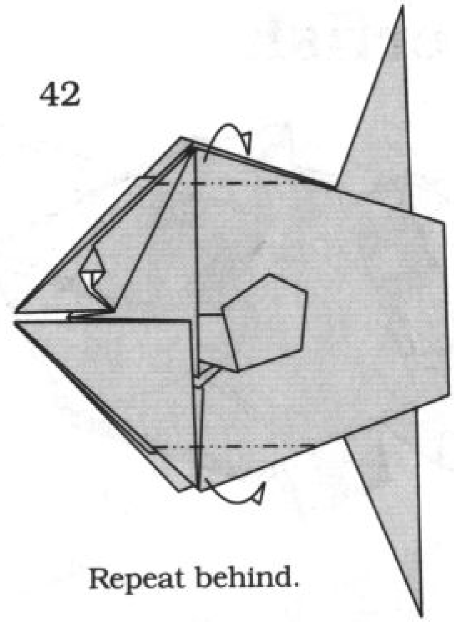
Repeat behind.

41



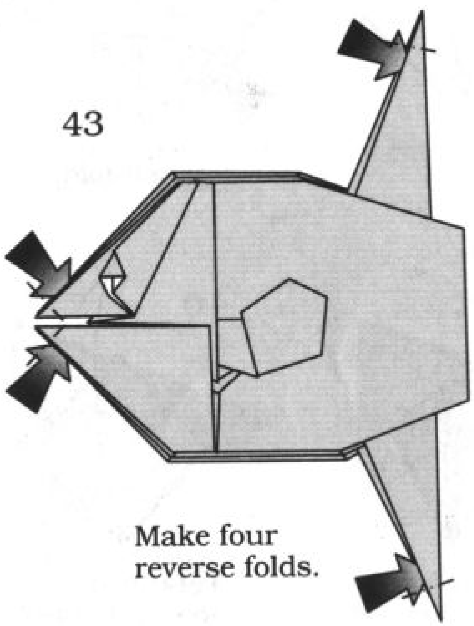
Squash-fold to form the eye. Repeat behind.

42



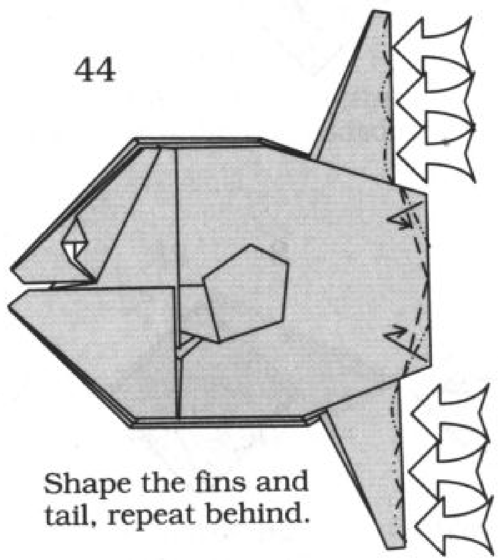
Repeat behind.

43



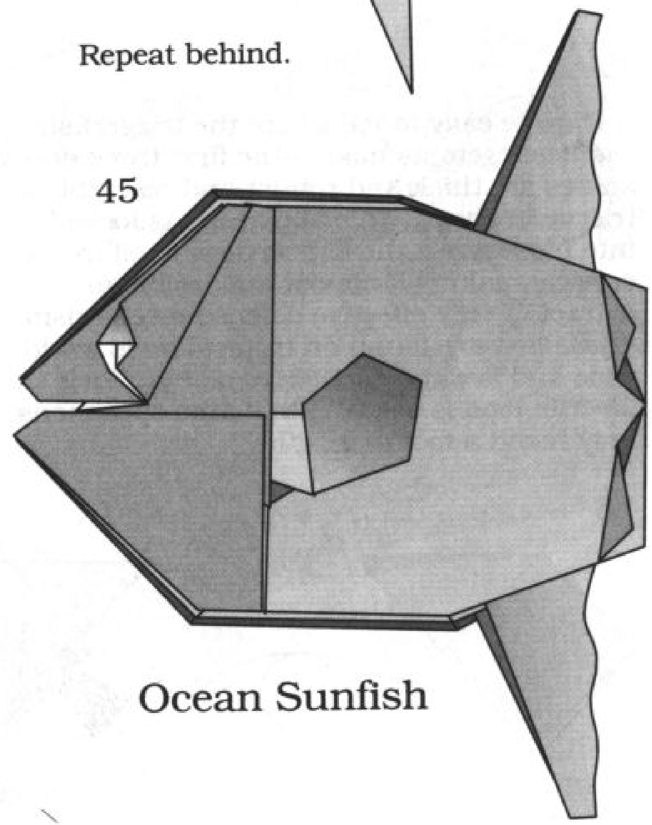
Make four reverse folds.

44



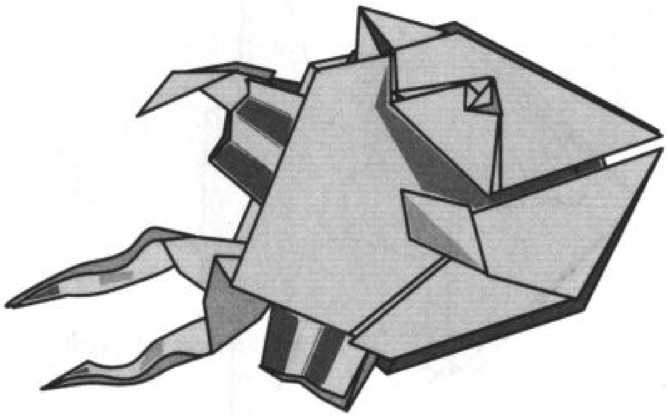
Shape the fins and tail, repeat behind.

45



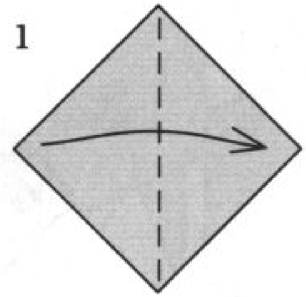
Ocean Sunfish

Triggerfish

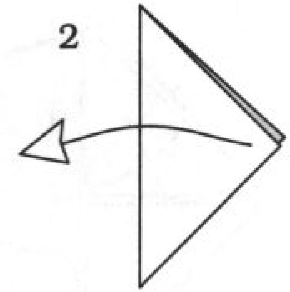


It is quite easy to tell where the triggerfish (*Balistes*) gets its name—the first three dorsal spines are thick and robust and resemble a trigger in shape. This apparatus is locked into place while the fish wedges itself into a crevice, making it almost impossible to extract, a very effective defense mechanism. These fish are found on tropical reefs world wide and are spectacularly colored. Their favorite food is sea urchin. Large specimens may reach a foot in length.

1

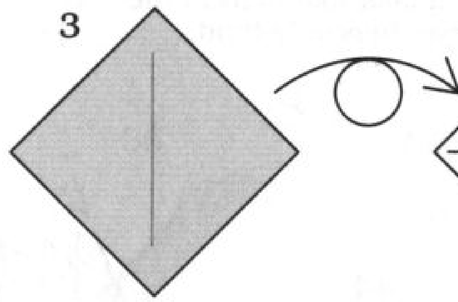


2

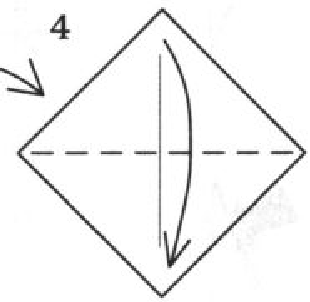


Unfold.

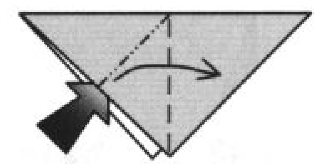
3



4

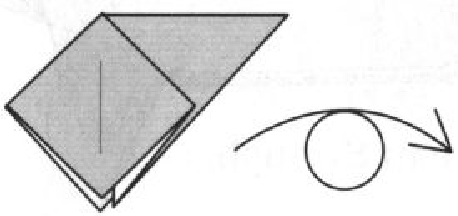


5

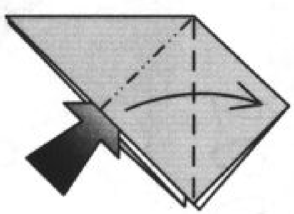


Squash-fold.

6



7



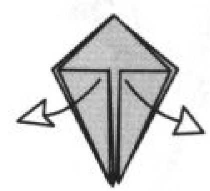
Squash-fold.

8



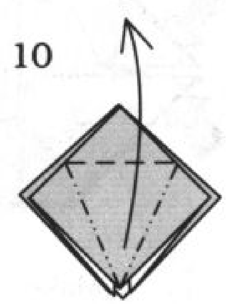
Kite-fold.
Repeat behind.

9



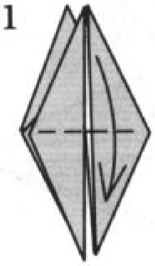
Unfold.
Repeat behind.

10



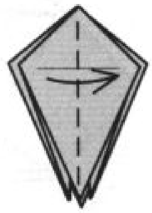
Petal-fold.
Repeat behind.

11



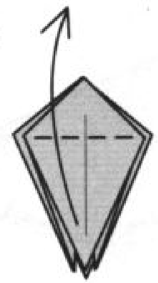
Repeat behind.

12



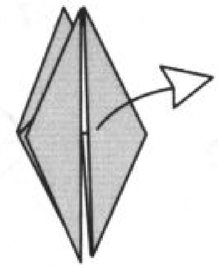
Repeat behind.

13



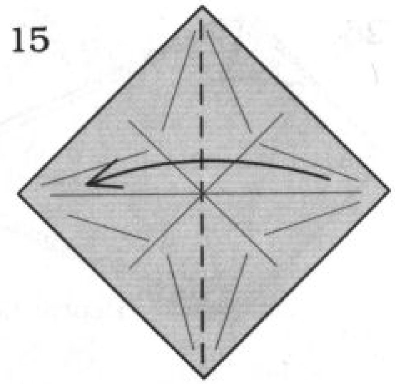
Repeat behind.

14

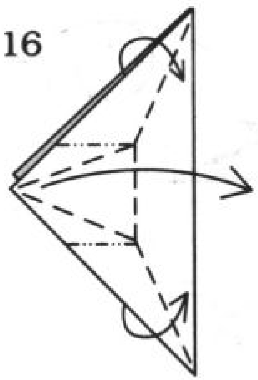


Unfold everything.

15

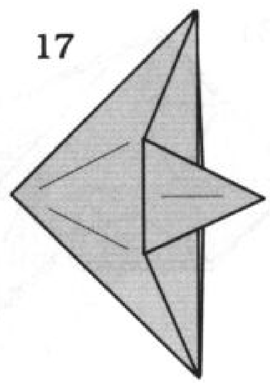


16



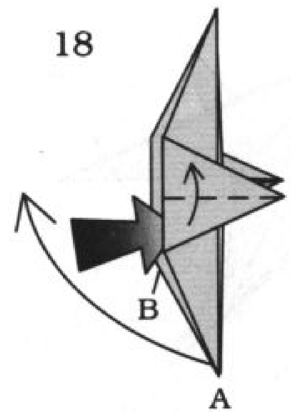
Fold on some of the exsisting creases.

17



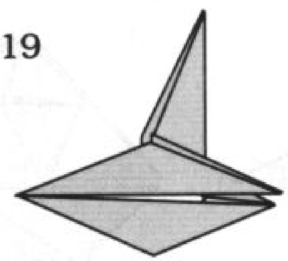
Repeat step 16 behind.

18



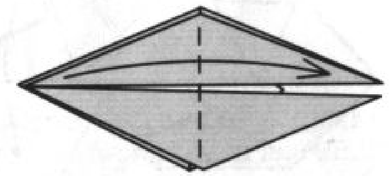
Fold A up and to the left while B is folded up.

19



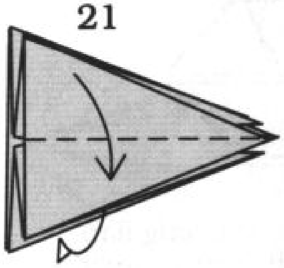
Repeat step 18 behind.

20

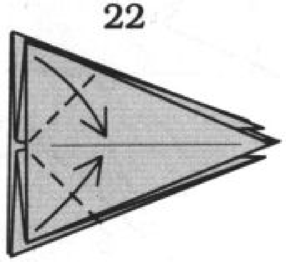


Repeat behind.

21

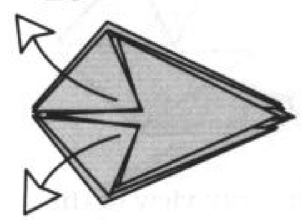


22



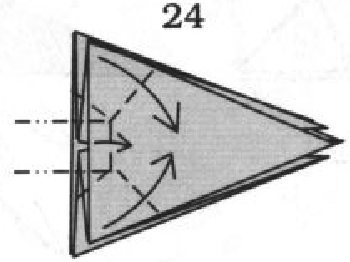
Repeat behind.

23



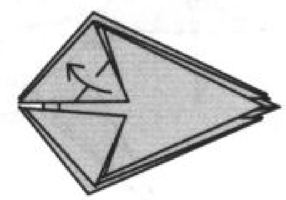
Unfold, repeat behind.

24



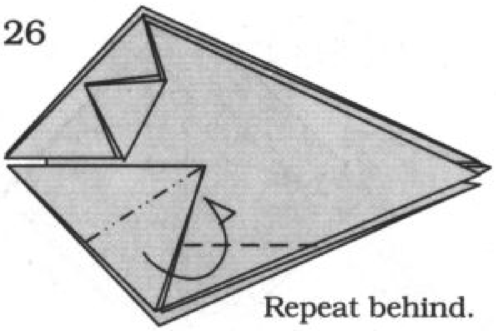
Repeat behind.

25



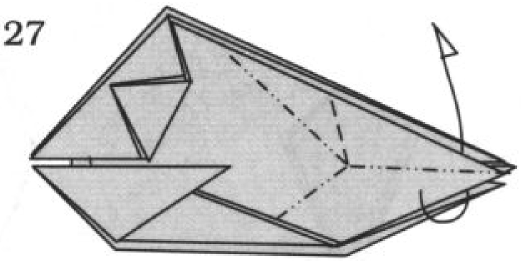
Repeat behind.

26



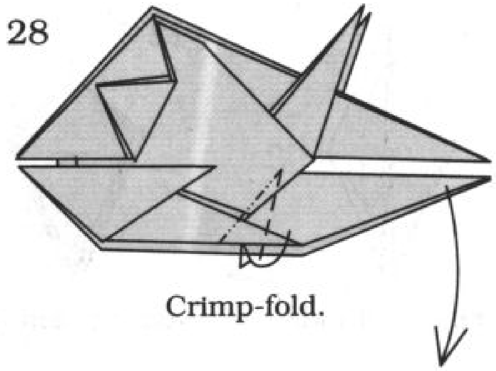
Repeat behind.

27



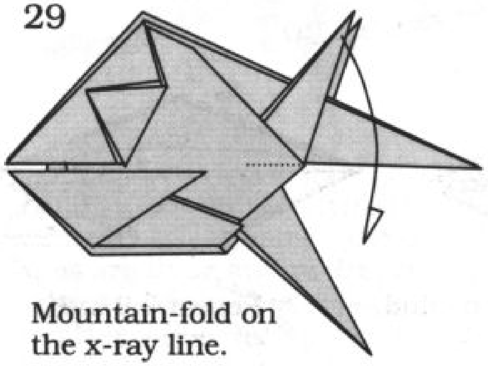
Rabbit-ear.
Repeat behind.

28



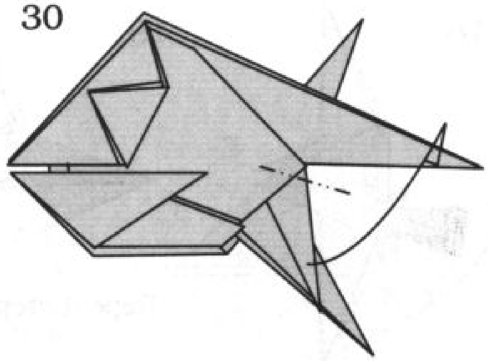
Crimp-fold.

29

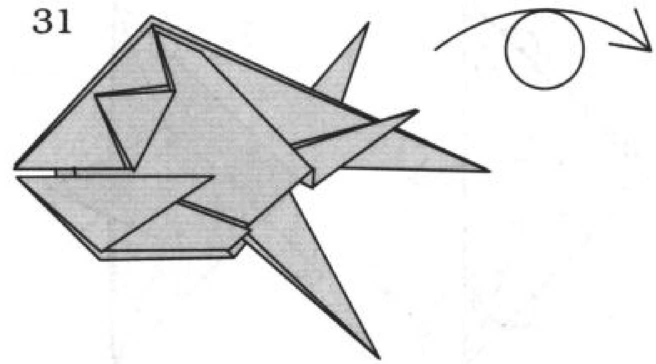


Mountain-fold on the x-ray line.

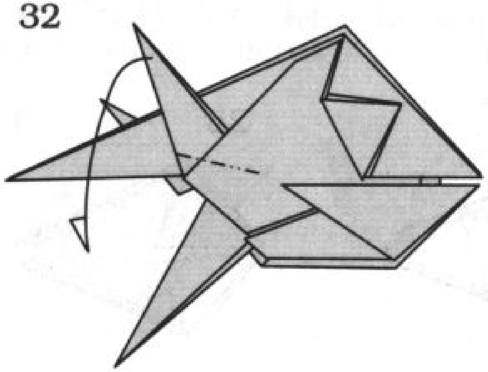
30



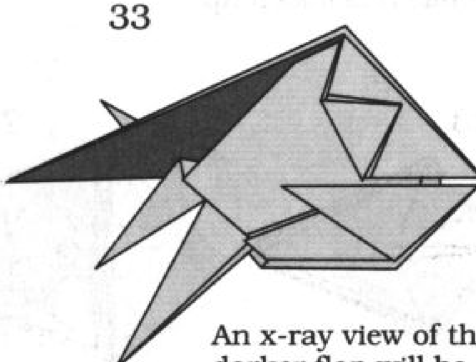
31



32

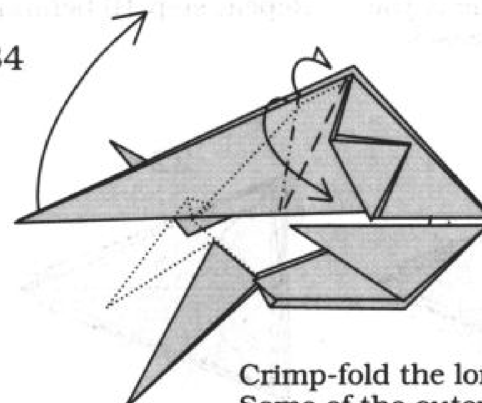


33



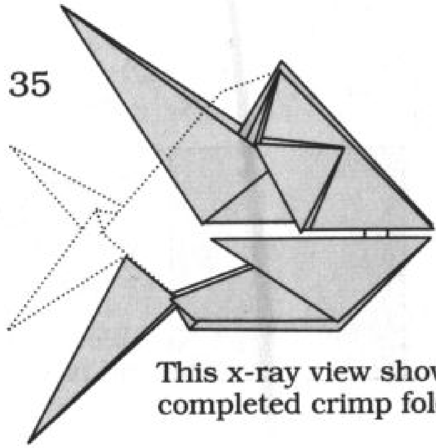
An x-ray view of the darker flap will be shown in the next step.

34



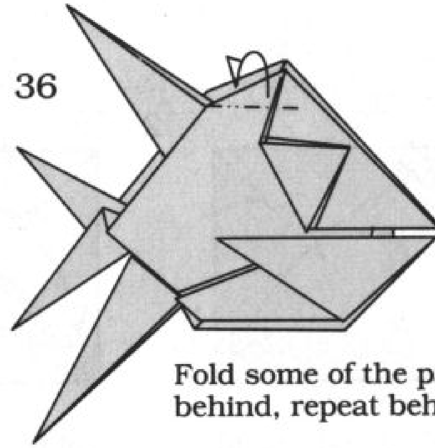
Crimp-fold the long flap. Some of the outer paper is drawn with dotted lines so the inner layer can be seen.

35



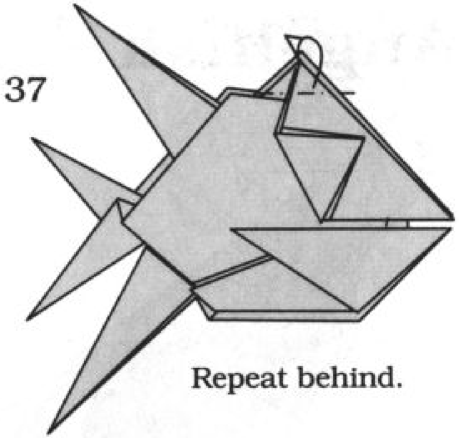
This x-ray view shows the completed crimp fold.

36



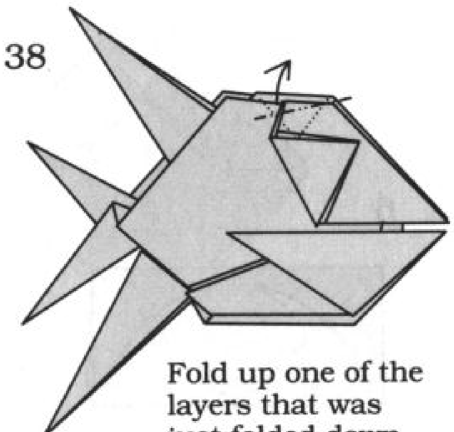
Fold some of the paper behind, repeat behind.

37



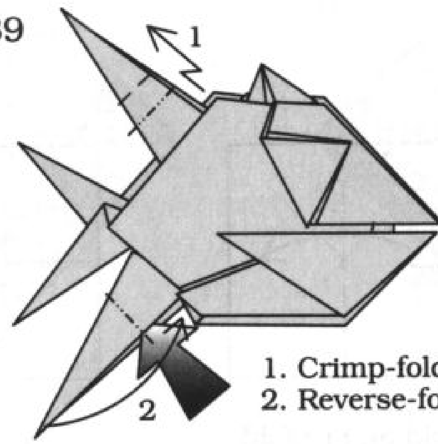
Repeat behind.

38



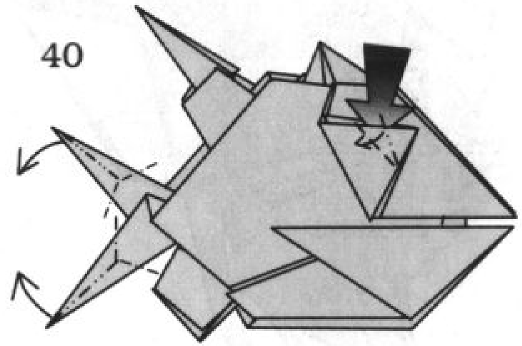
Fold up one of the layers that was just folded down.

39



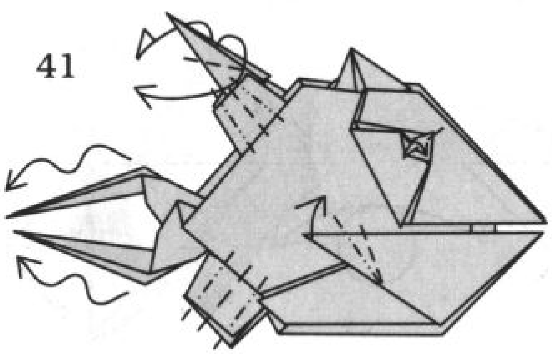
1. Crimp-fold.
2. Reverse-fold.

40



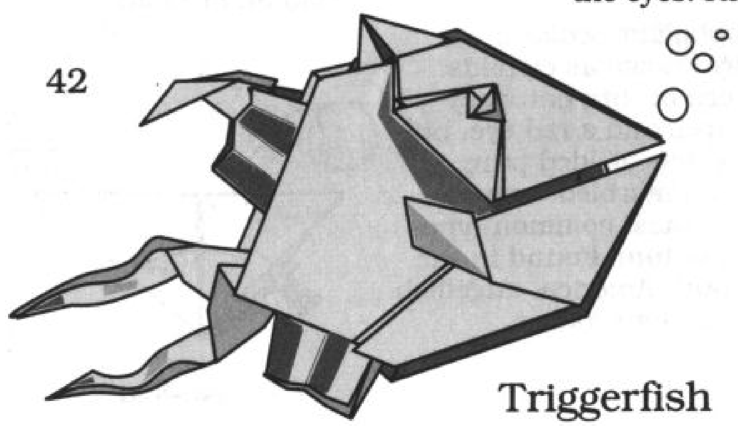
Double-rabbit-ear the tips of the tail. Squash-fold the eyes. Repeat behind.

41



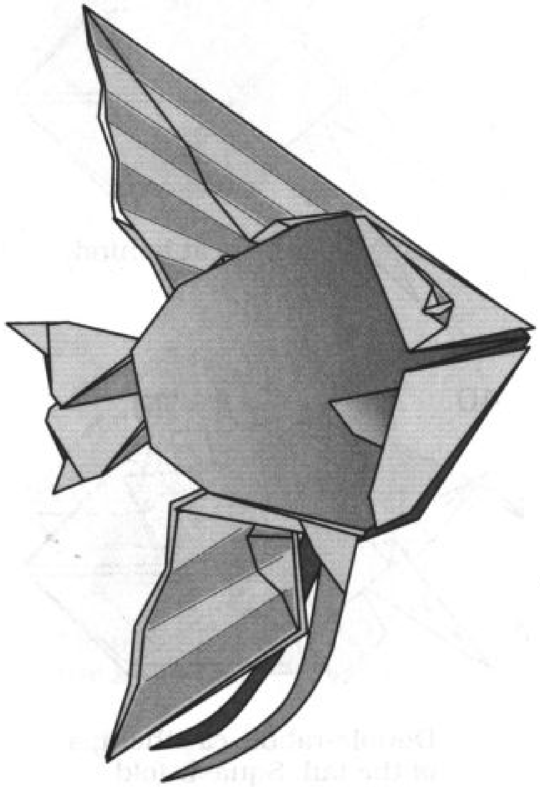
Repeat behind.

42



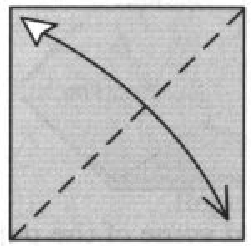
Triggerfish

Angelfish



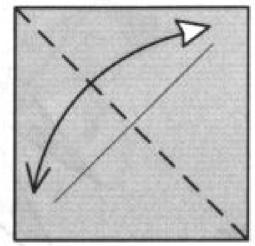
The angelfish (*Pterophyllum scalara*) belongs to the family known as cichlids. Only one color pattern occurs naturally—silver with black stripes and a red eye, but genetic manipulation has yielded pure silver, gold, calico, and marbled varieties. This fish is one of the most common types kept in the home aquarium. Found in the Amazon region in South America, angelfish are seldom longer than four inches.

1



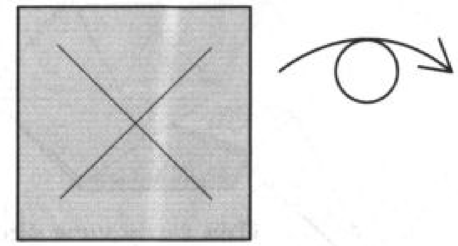
Fold and unfold.

2

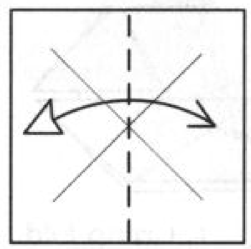


Fold and unfold.

3

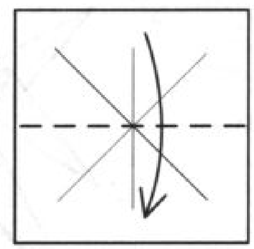


4

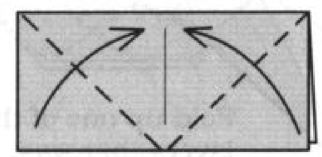


Fold and unfold.

5

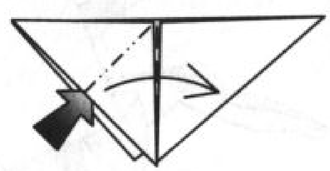


6



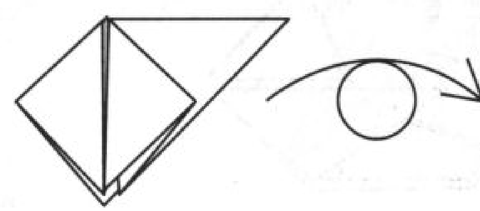
Repeat behind.

7

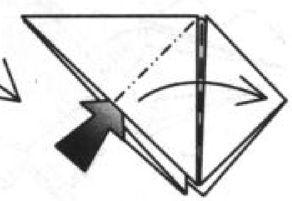


Squash-fold.

8

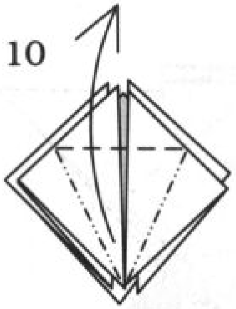


9



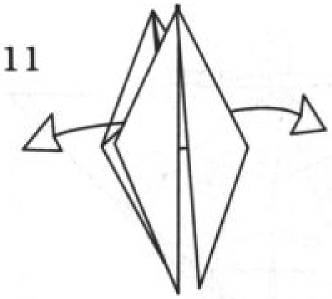
Squash-fold.

10



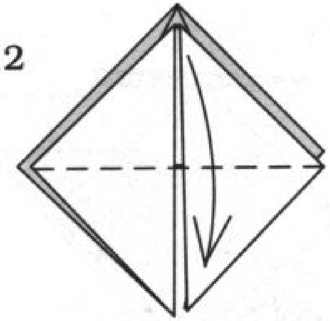
Petal-fold.
Repeat behind.

11

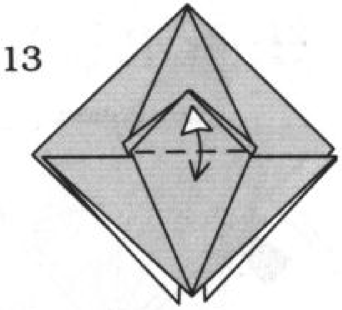


Pull out the loose
paper. Repeat behind.

12

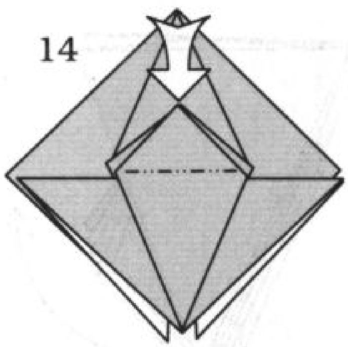


13



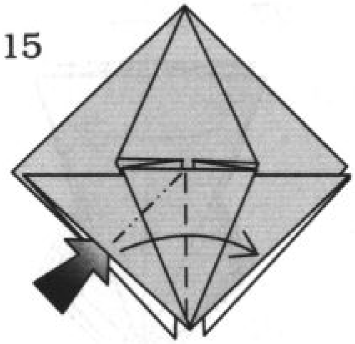
Fold down and unfold.

14



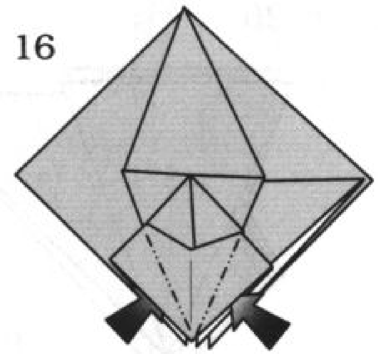
Sink.

15



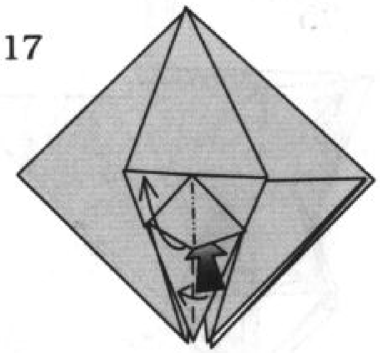
Squash-fold.

16

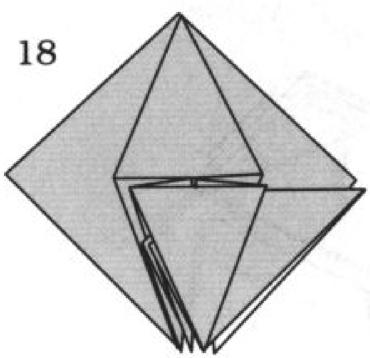


Reverse-folds.

17

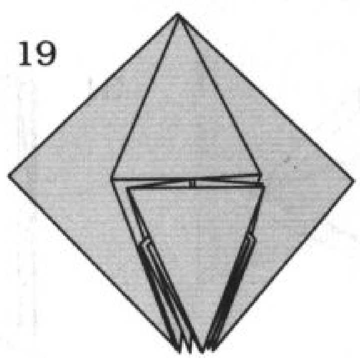


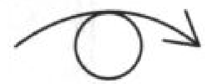
18



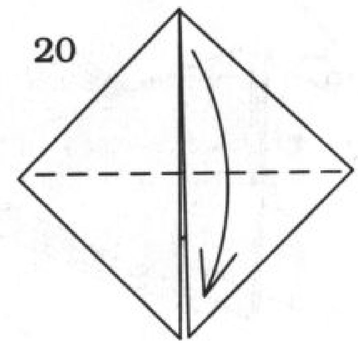
Repeat steps 15–17
on the right.

19

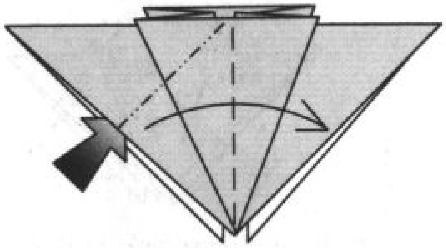




20

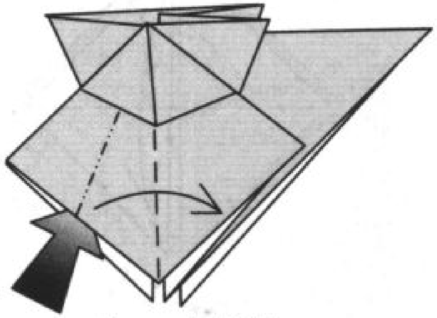


21



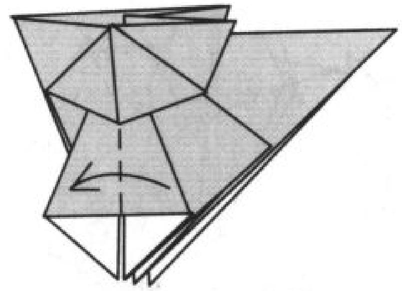
Squash-fold.

22

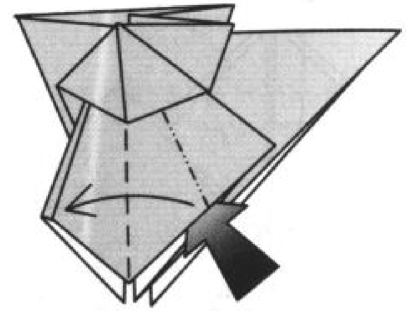


Squash-fold.

23

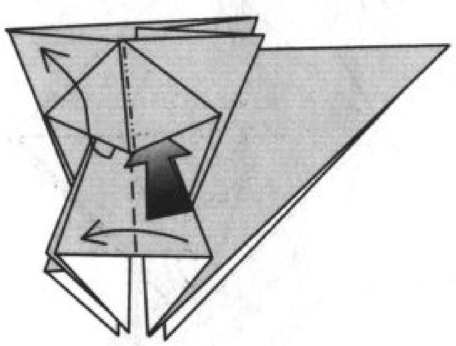


24

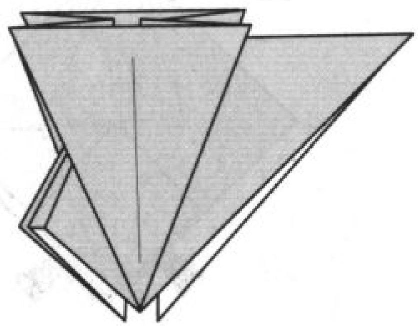


Squash-fold.

25

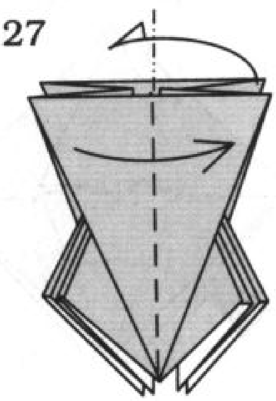


26

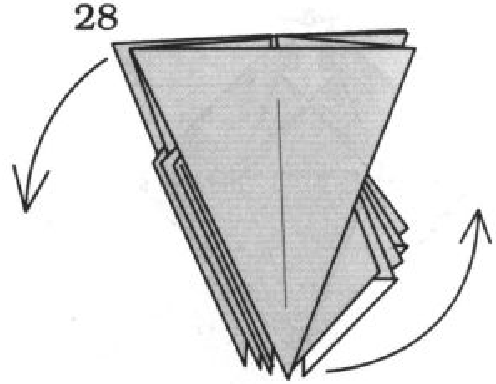


Repeat steps 21–25 on the right.

27

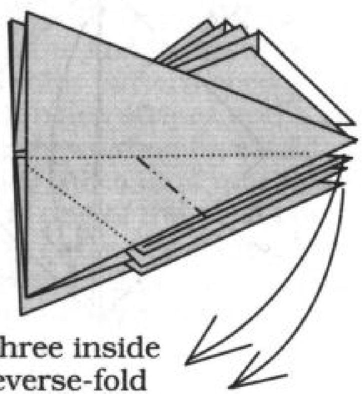


28



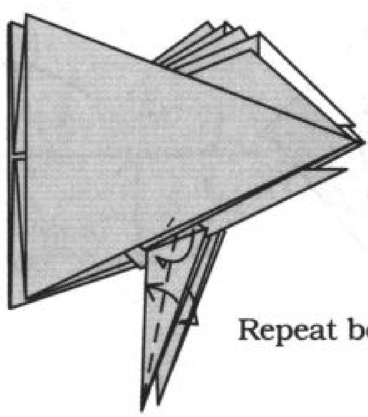
Rotate the model.

29



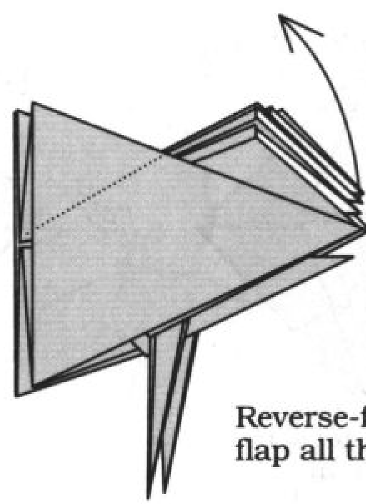
Of the three inside flaps, reverse-fold the first and third.

30



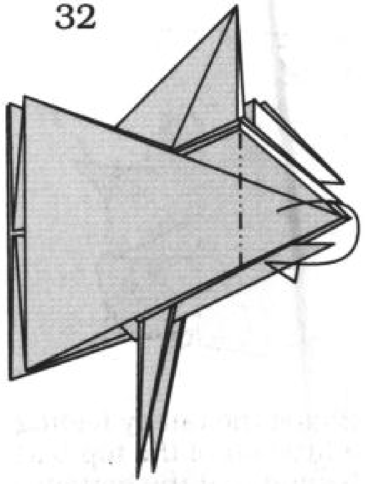
Repeat behind.

31



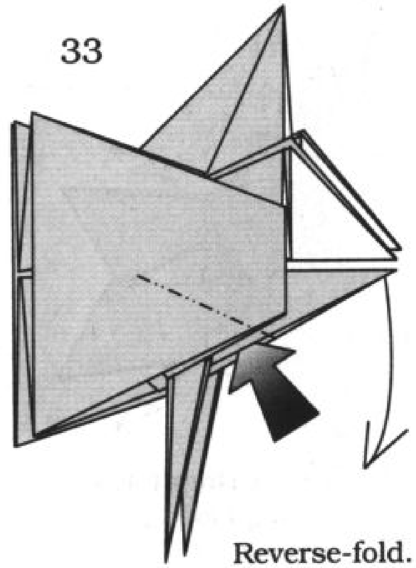
Reverse-fold the center flap all the way up.

32



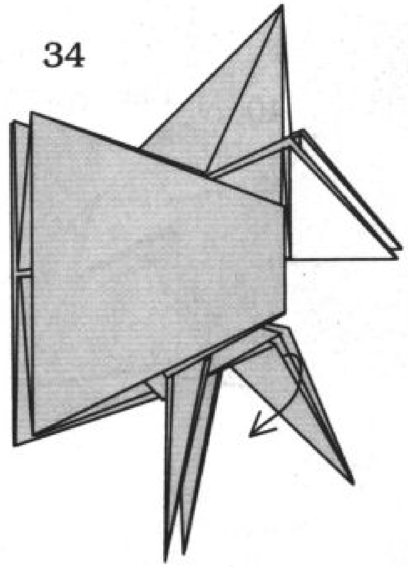
Repeat behind.

33



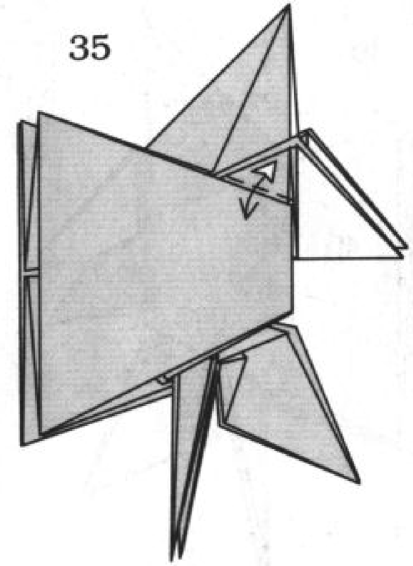
Reverse-fold.

34



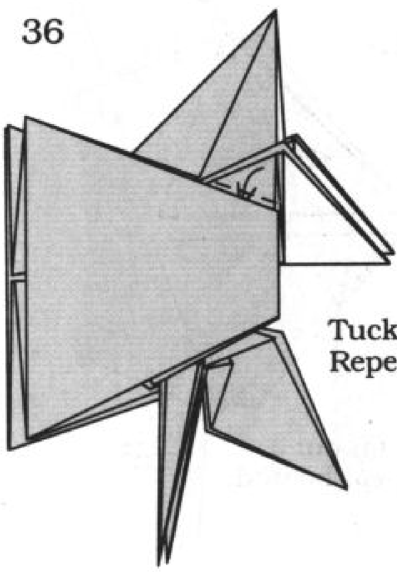
Repeat behind.

35



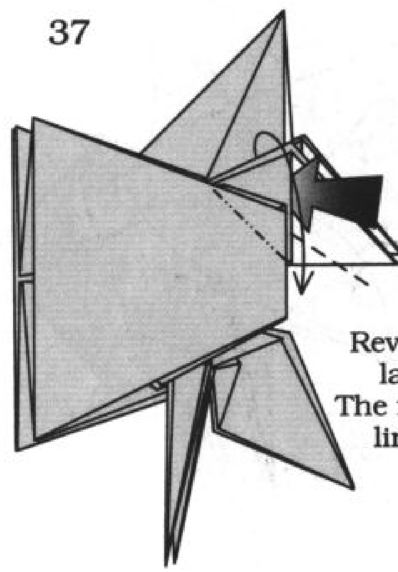
Fold down and unfold.
Repeat behind.

36



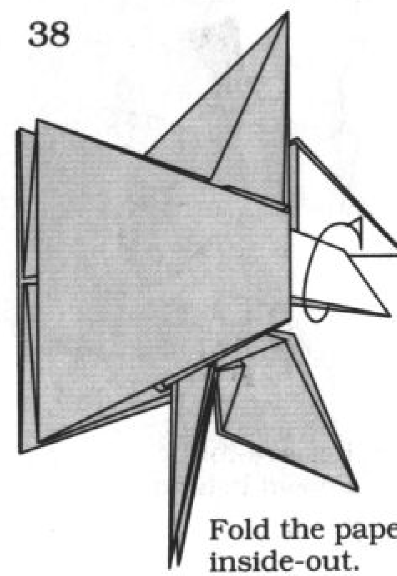
Tuck inside.
Repeat behind.

37



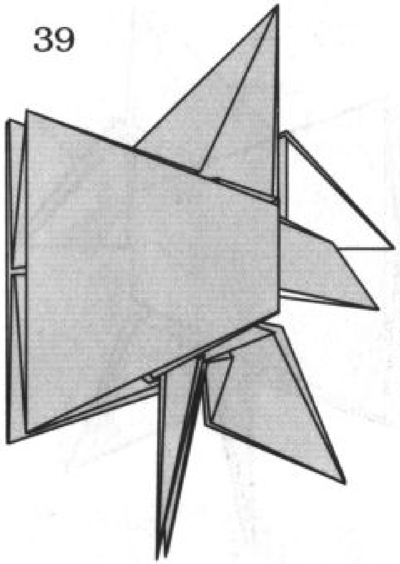
Reverse-fold both layers together. The mountain fold line refers to an inside layer.

38



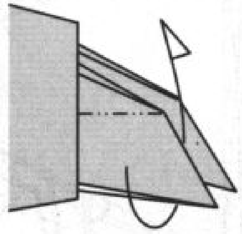
Fold the paper inside-out.

39

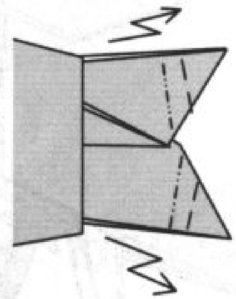


Repeat steps 37–38 behind.

40 Tail.

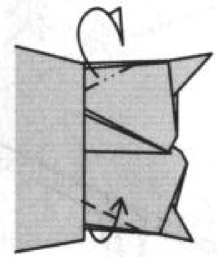


41



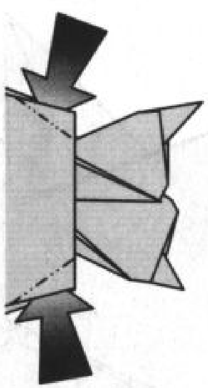
Crimp-folds.

42



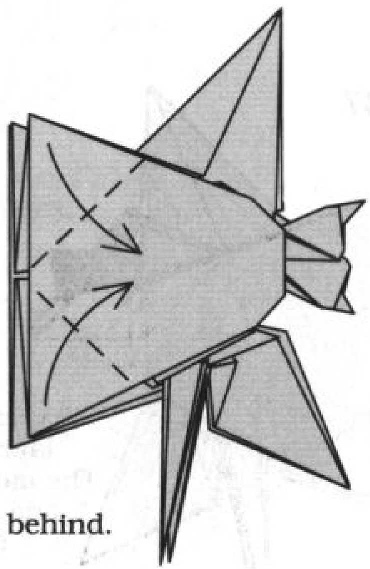
Shape the tail by folding a little bit of the top part behind and the bottom part in front.

43



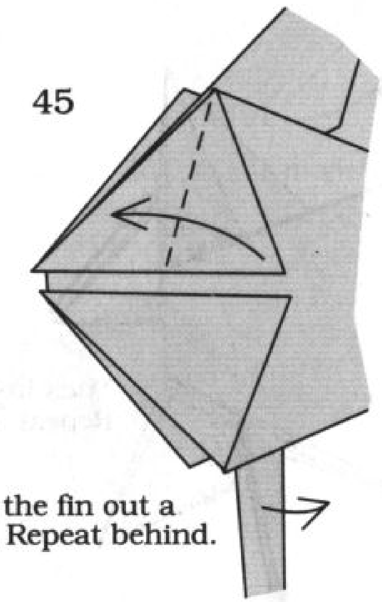
Reverse-folds. Repeat behind.

44



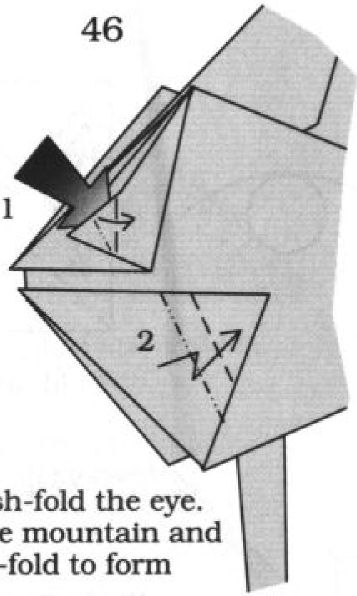
Repeat behind.

45



Slide the fin out a little. Repeat behind.

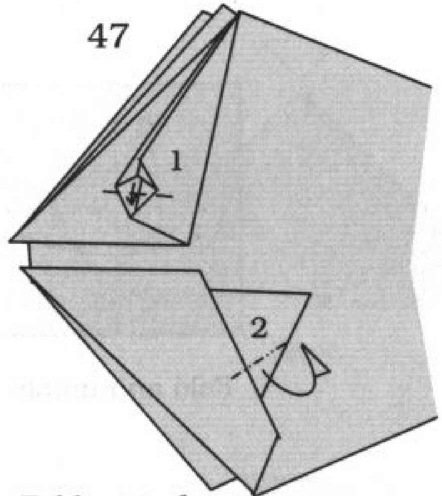
46



1. Squash-fold the eye.
2. Simple mountain and valley-fold to form a fin.

Repeat behind.

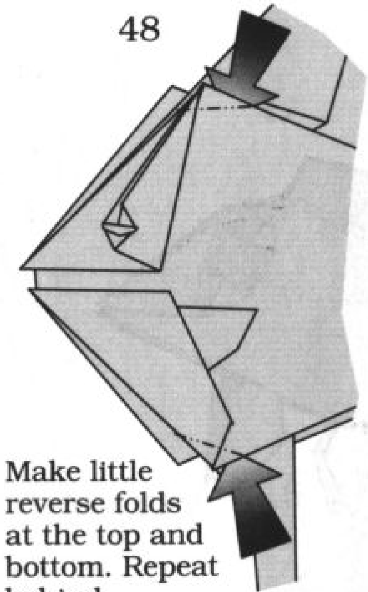
47



1. Fold part of eye down.
2. Fold behind to shape the fin.

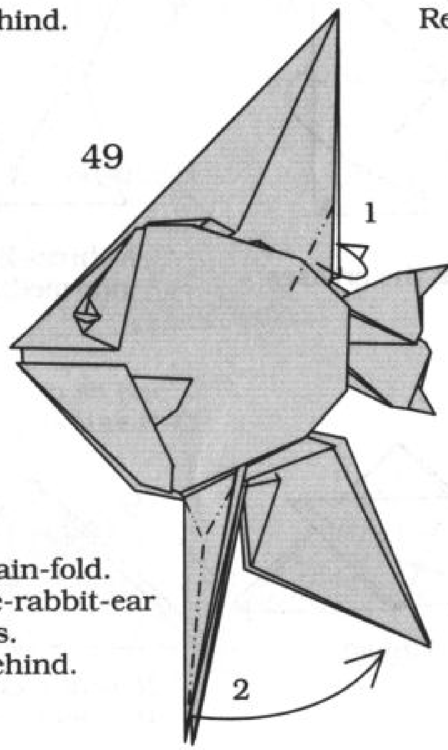
Repeat behind.

48



Make little reverse folds at the top and bottom. Repeat behind.

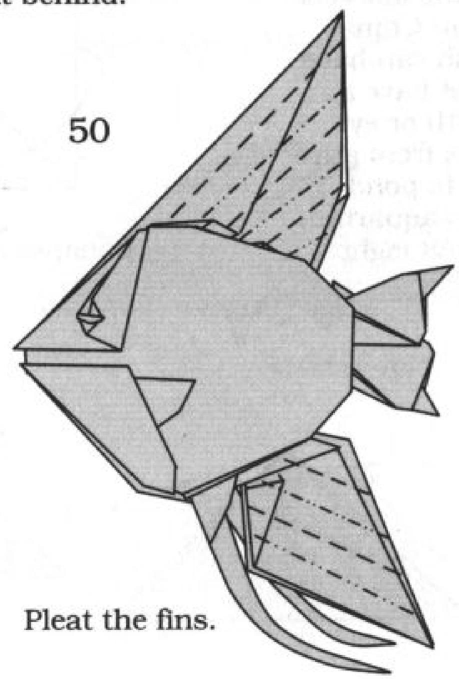
49



1. Mountain-fold.
2. Double-rabbit-ear the fins.

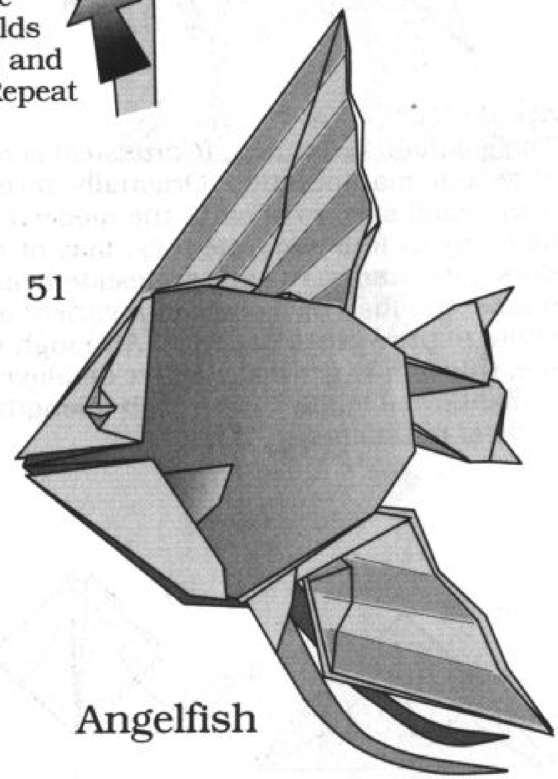
Repeat behind.

50



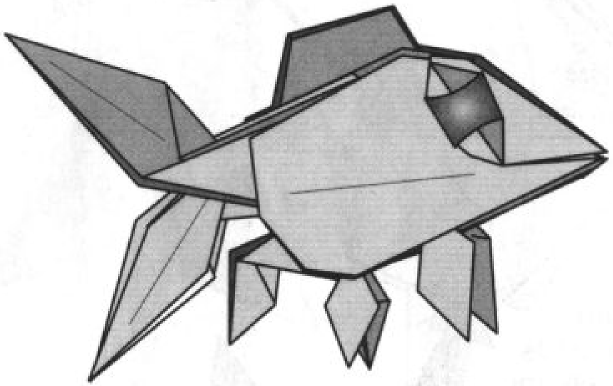
Pleat the fins.

51



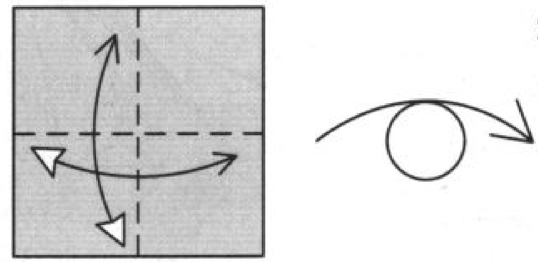
Angelfish

Goldfish



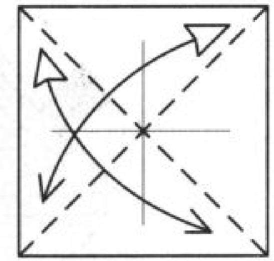
The goldfish, or oranda, (*Carassuis*) is one of the marvels of genetic manipulation. Originally developed in China from small species of carp, the modern goldfish can have as many as four separate tails, may or may not have a dorsal fin, and may have grotesque head growth or eye shape. Goldfish also come in a variety of colors from pure white to pure black to calico. Although suited to pond life, this fish is generally better displayed in an aquarium or fishbowl. Goldfish can reach a length of about eight inches, not including the tail.

1



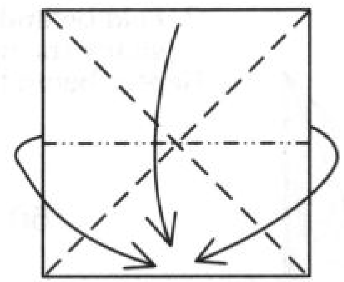
Fold and unfold.

2



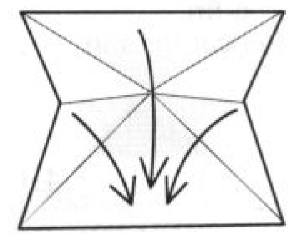
Fold and unfold.

3



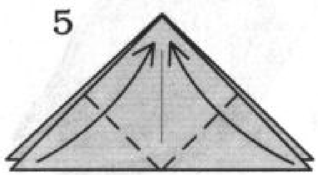
Collapse along the creases.

4



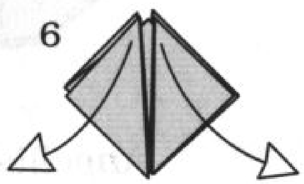
A three-dimensional intermediate step.

5



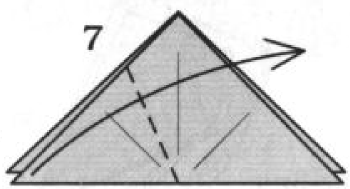
Repeat behind.

6

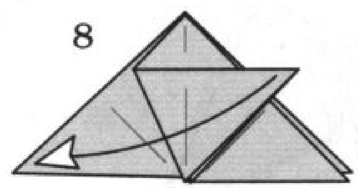


Unfold.

7

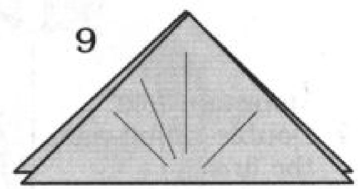


8



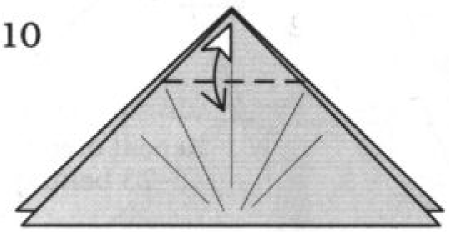
Unfold.

9



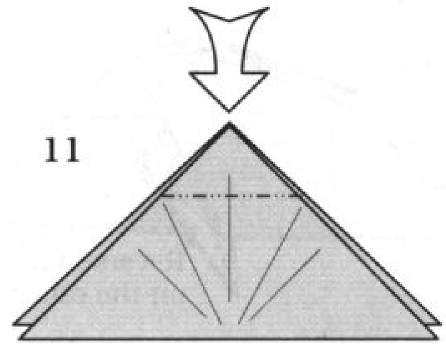
Repeat steps 7–8 on the right and behind.

10



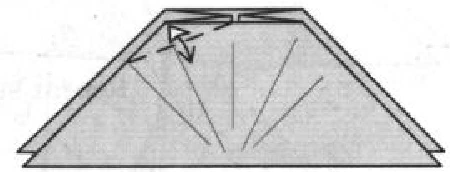
Fold down and unfold.

11



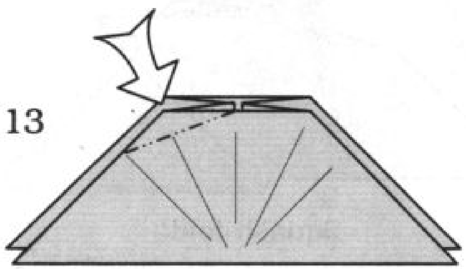
Sink.

12



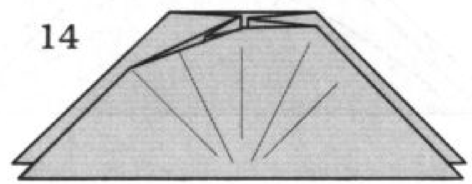
Fold and unfold.

13



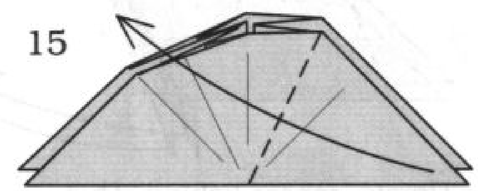
Sink.

14

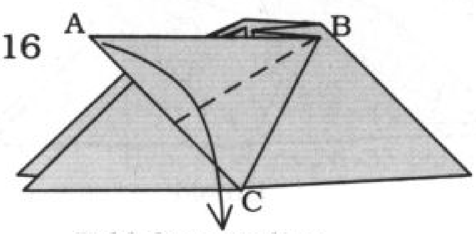


Repeat steps 12–13 behind.

15

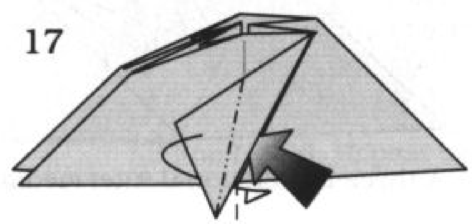


16



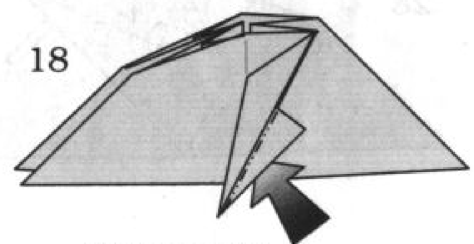
Fold down so line
A–B meets line B–C.

17



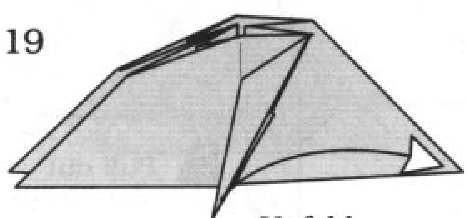
Reverse-fold.

18



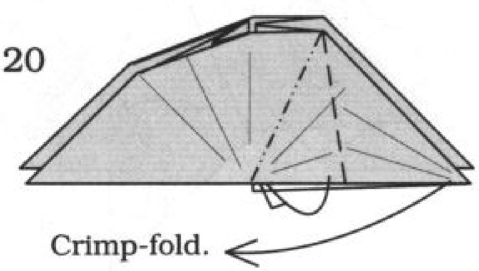
Reverse-fold.

19



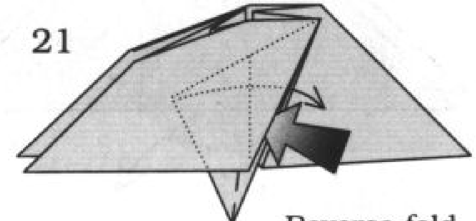
Unfold.

20



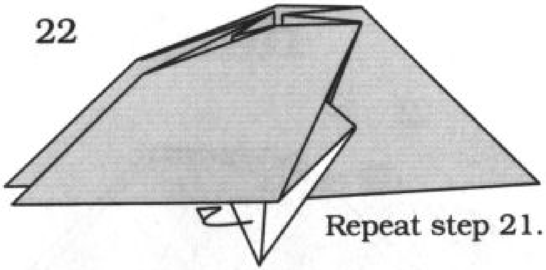
Crimp-fold.

21



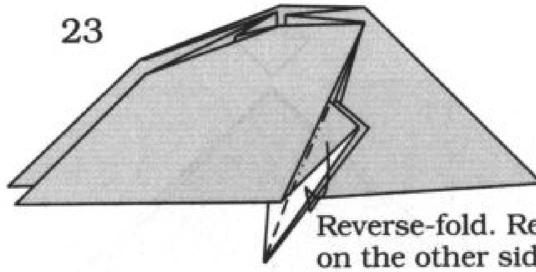
Reverse-fold.

22



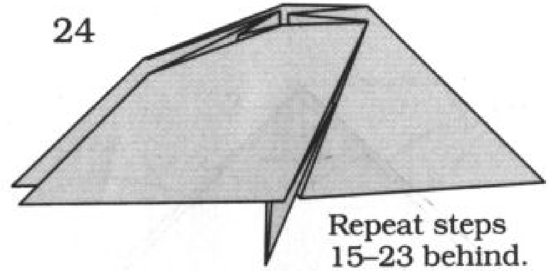
Repeat step 21.

23



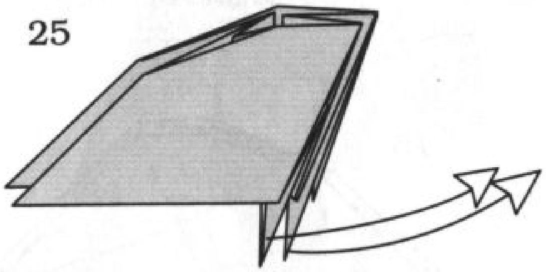
Reverse-fold. Repeat on the other side.

24



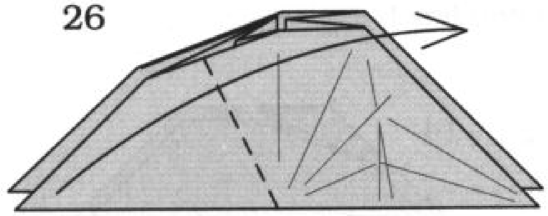
Repeat steps 15–23 behind.

25

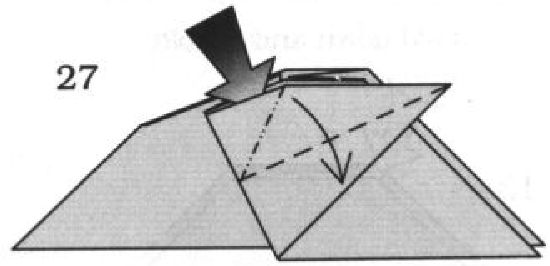


Unfold, repeat behind. This will be folded back later.

26

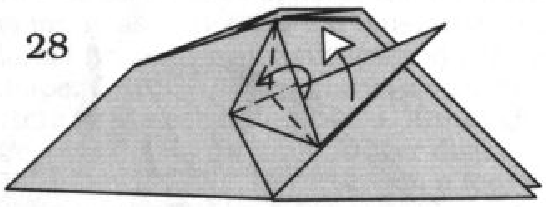


27

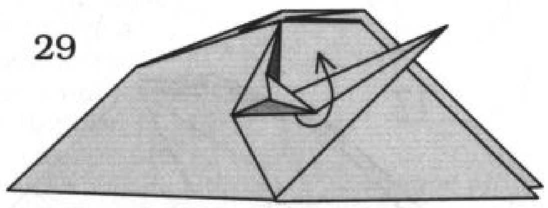


Squash-fold.

28

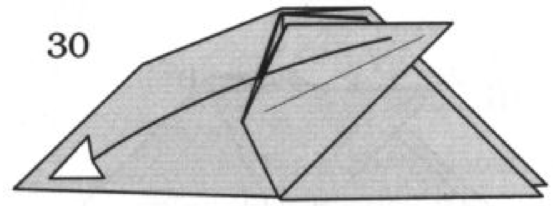


29



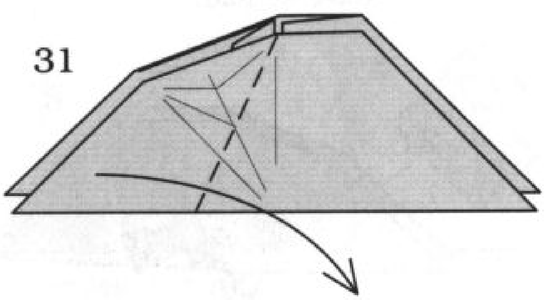
A three-dimensional intermediate step.

30

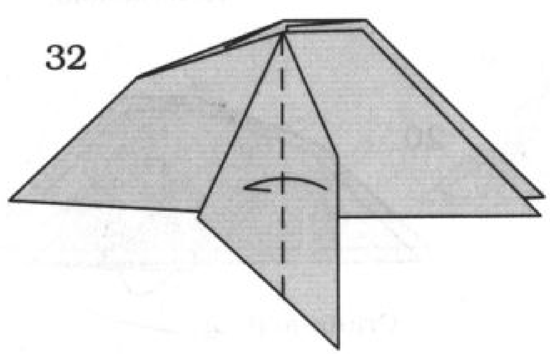


Unfold.

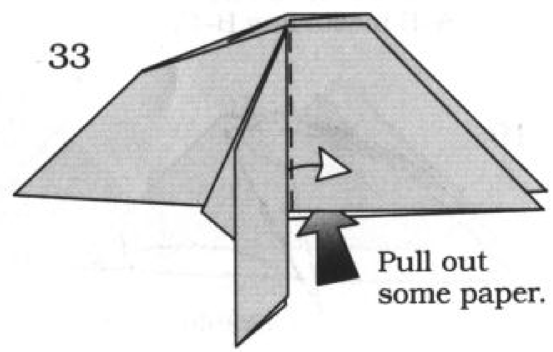
31



32

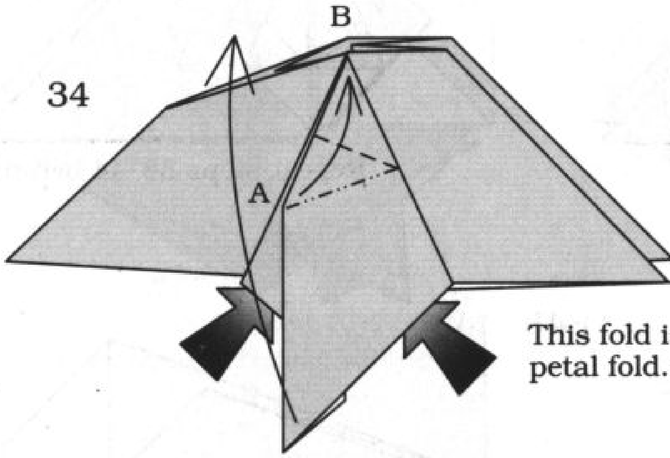


33



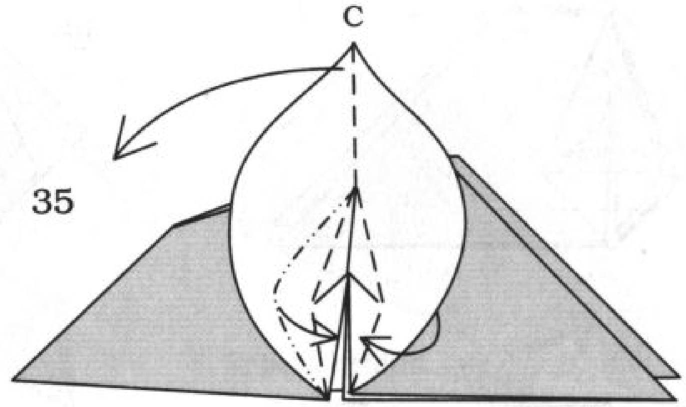
Pull out some paper.

34



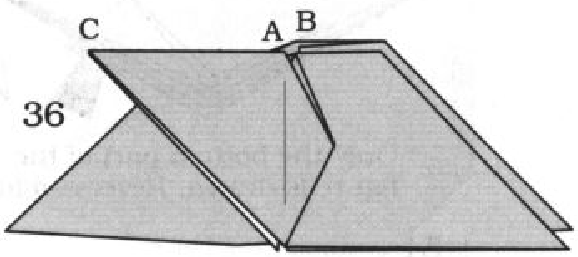
This fold is similar to a petal fold. Fold A to B.

35



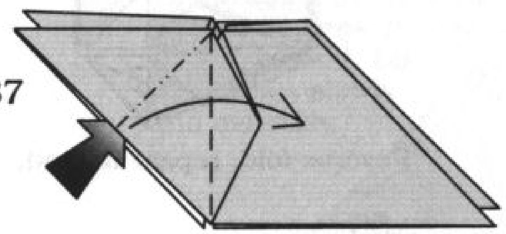
This is a three-dimensional step.

36



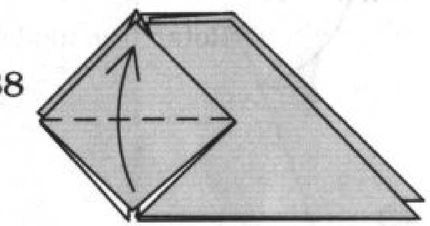
Repeat steps 26–35 behind.

37

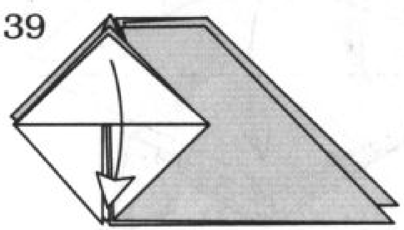


Squash-fold. Repeat behind.

38

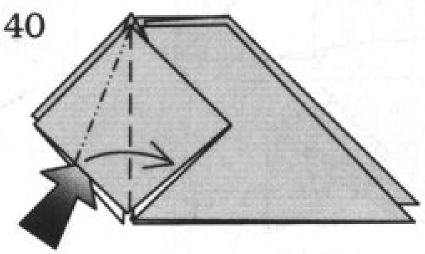


39



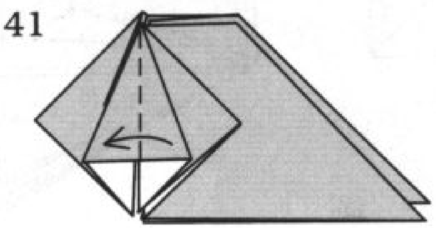
Unfold.

40

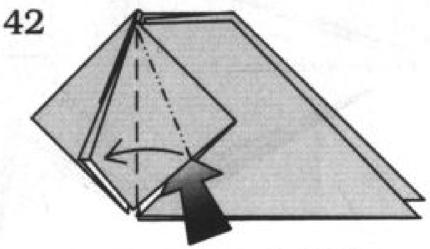


Squash-fold.

41

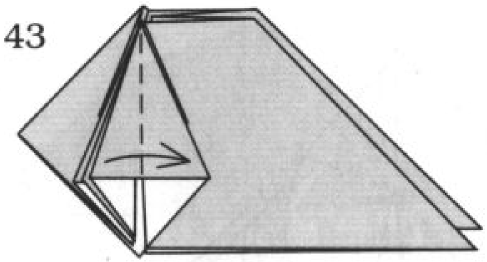


42

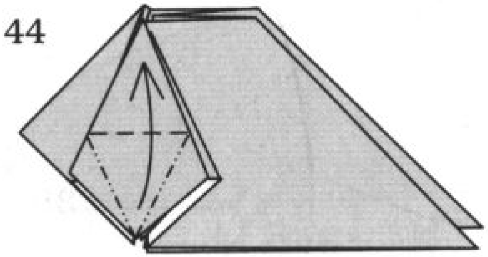


Squash-fold.

43

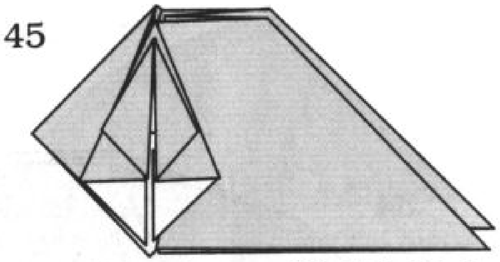


44



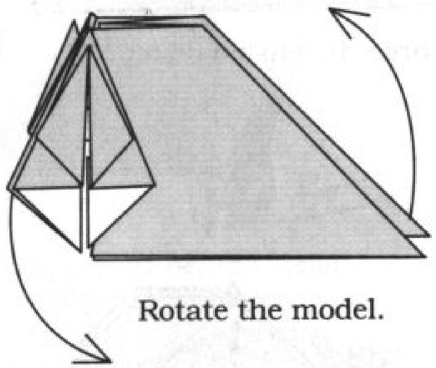
Petal-fold.

45



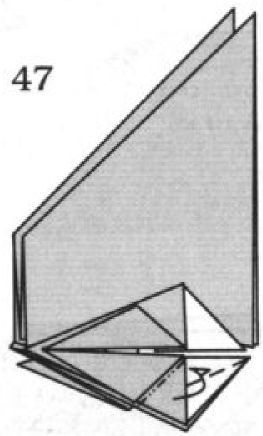
Repeat steps 38–44 behind.

46



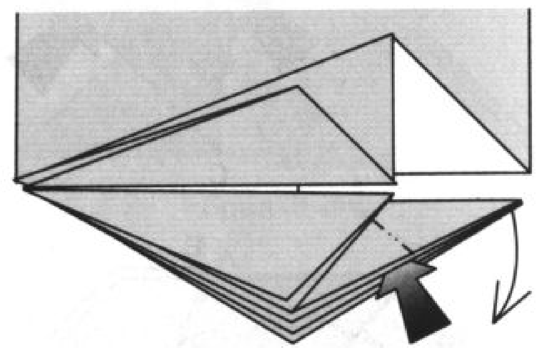
Rotate the model.

47



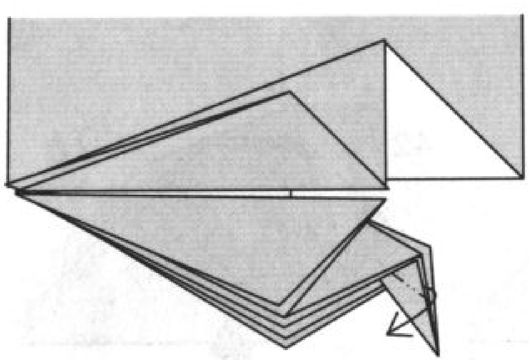
Reverse-fold, repeat behind.

48



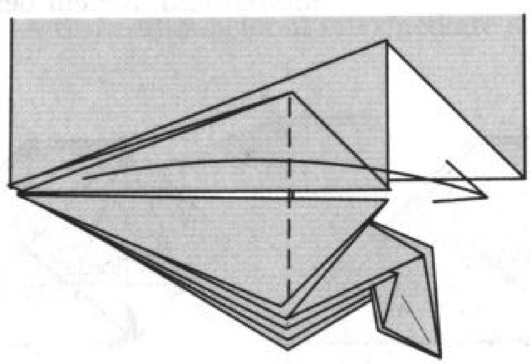
Only the bottom part of the figure is drawn. Reverse-fold.

49



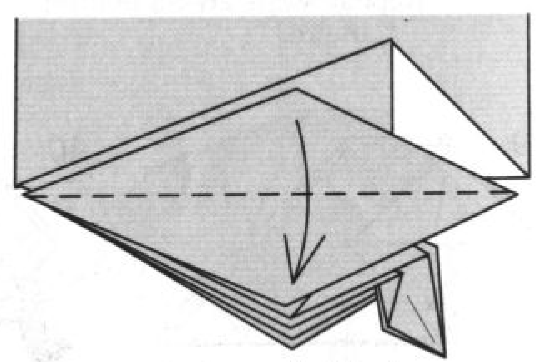
Spread the paper. Repeat behind.

50



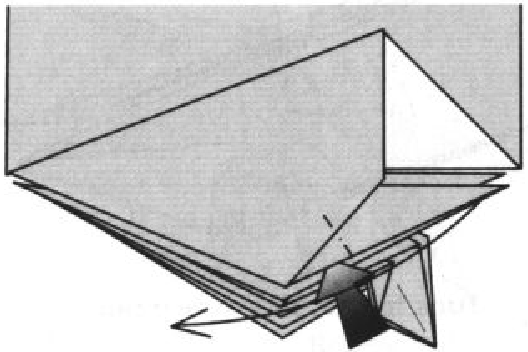
Repeat behind.

51



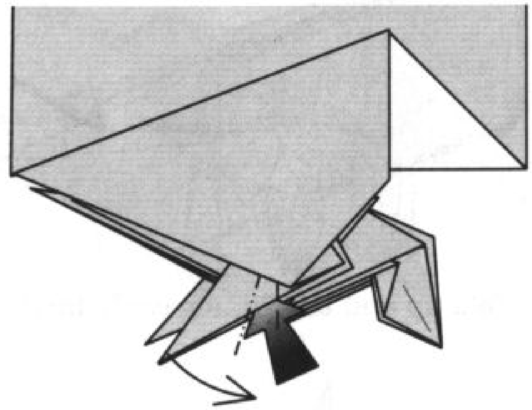
Repeat behind.

52



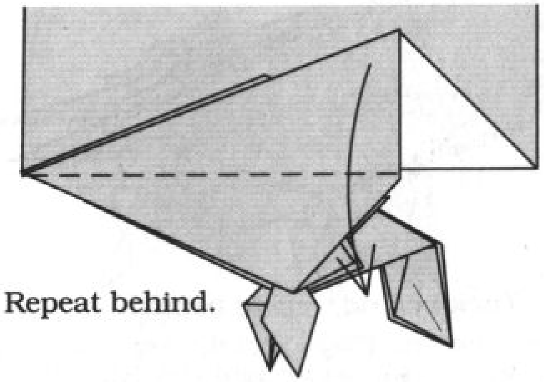
Reverse-fold, repeat behind.

53



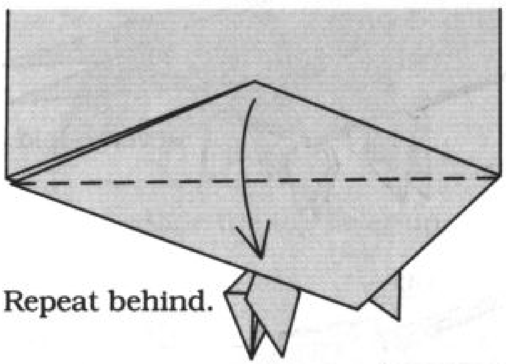
Squash-fold, repeat behind.

54



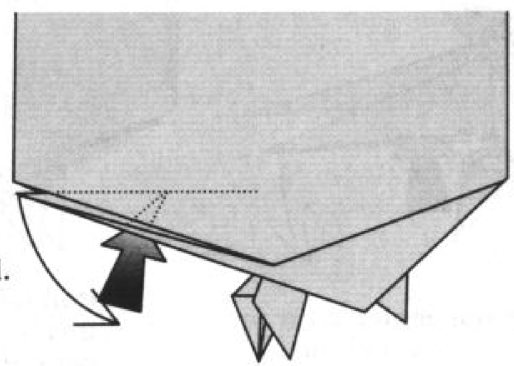
Repeat behind.

55



Repeat behind.

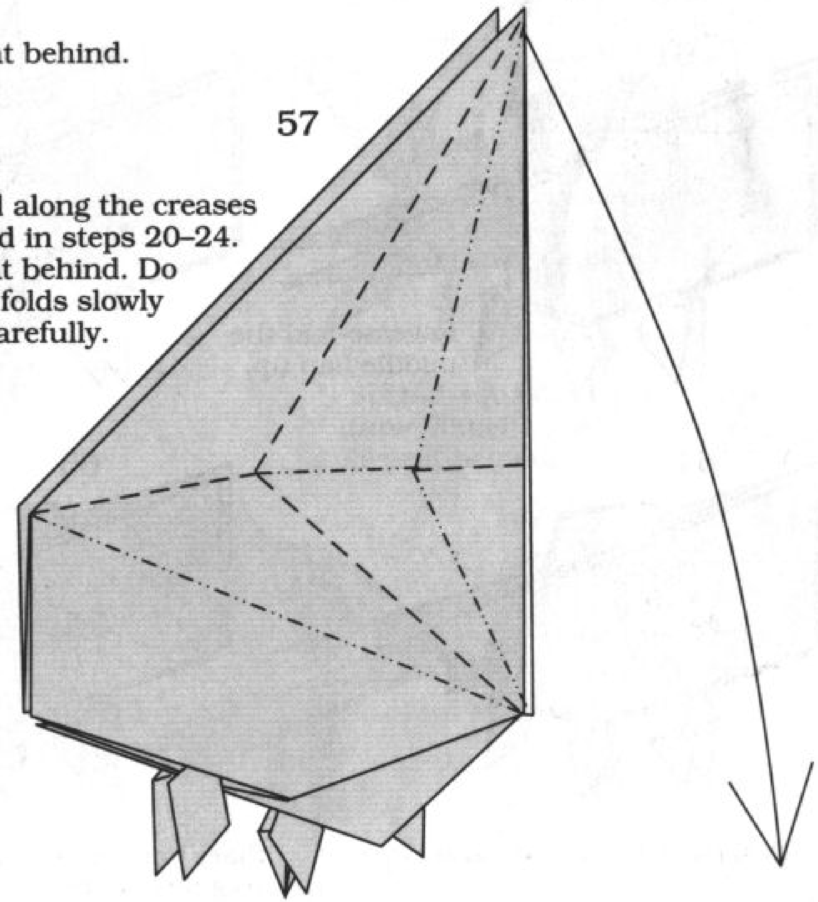
56



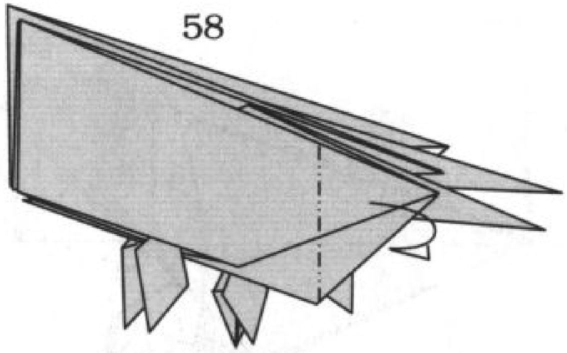
Squash-fold,
repeat behind.

57

Refold along the creases formed in steps 20–24. Repeat behind. Do these folds slowly and carefully.

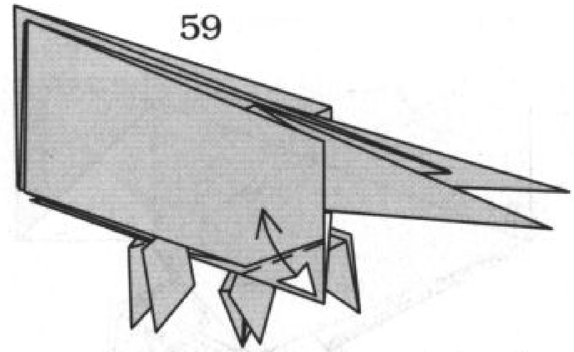


58



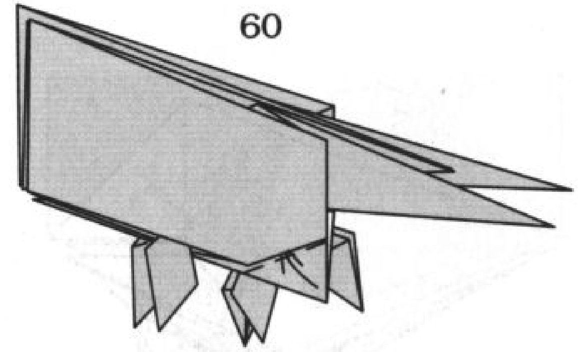
Tuck behind, repeat behind.

59



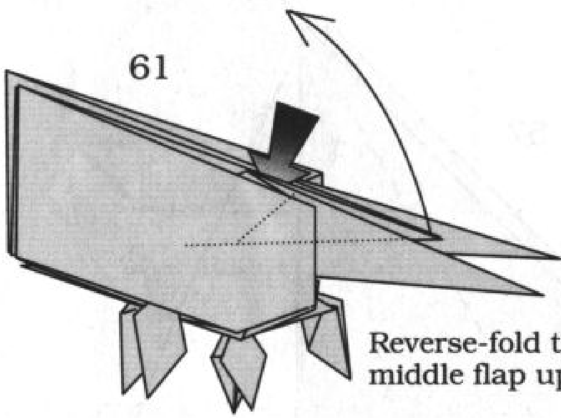
Fold up and unfold. Repeat behind.

60



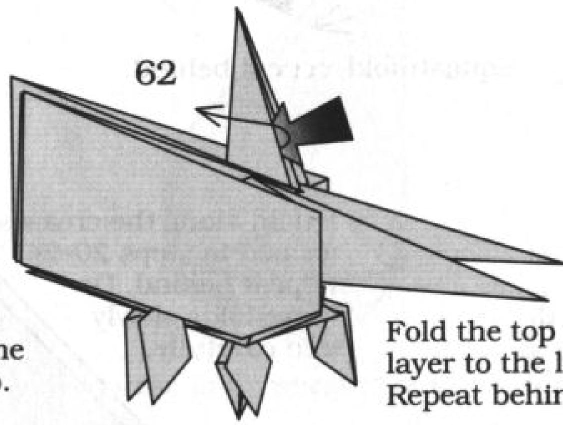
Tuck inside, repeat behind.

61



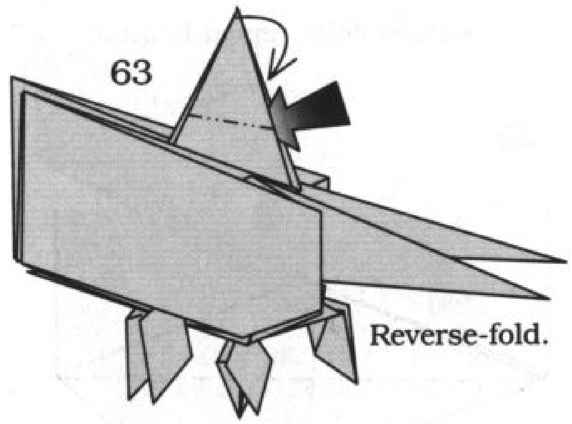
Reverse-fold the middle flap up.

62



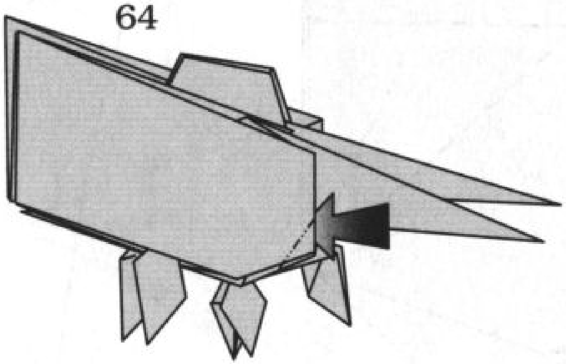
Fold the top layer to the left. Repeat behind.

63



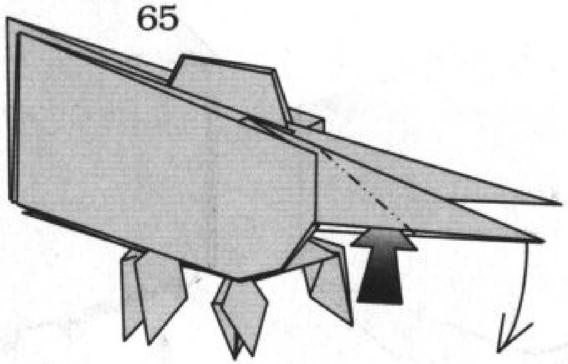
Reverse-fold.

64



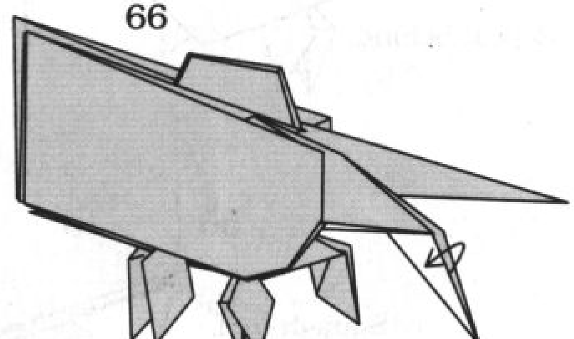
Reverse-fold, repeat behind.

65



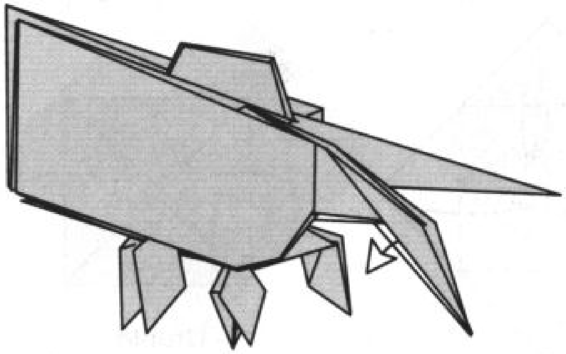
Place your finger inside the center layer for this reverse fold. Do not repeat behind.

66



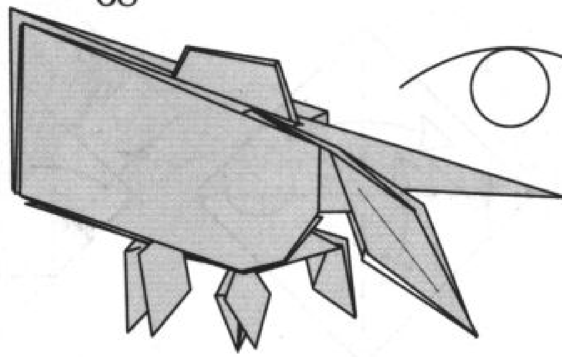
Pull paper out from the inside of the tail. Repeat behind on this flap.

67

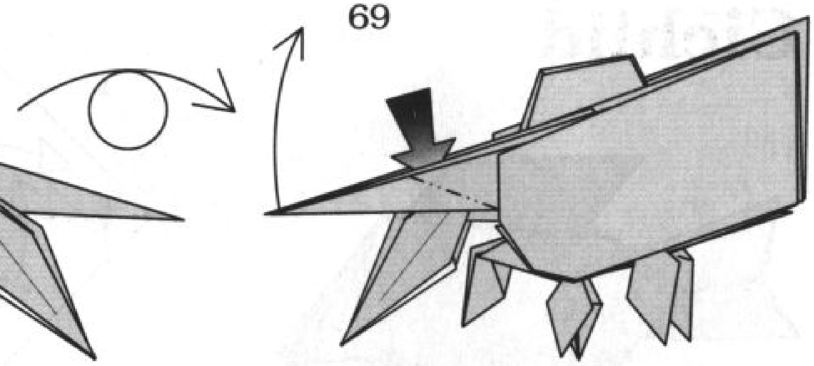


Pull out some paper. Repeat behind.

68

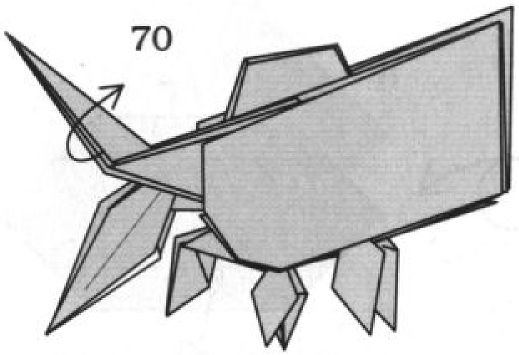


69



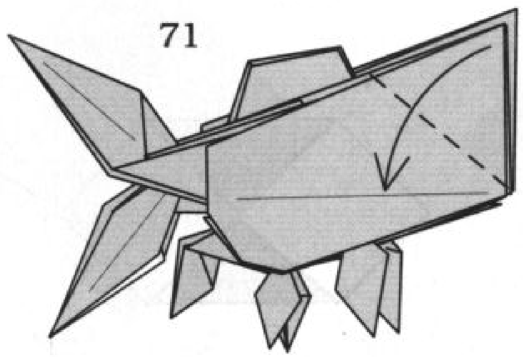
Place your finger inside the second pocket for this reverse fold.

70



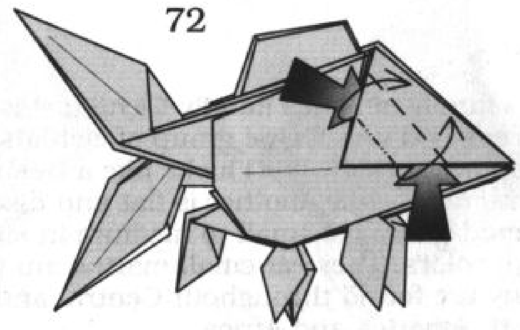
Slide the top layer up.

71



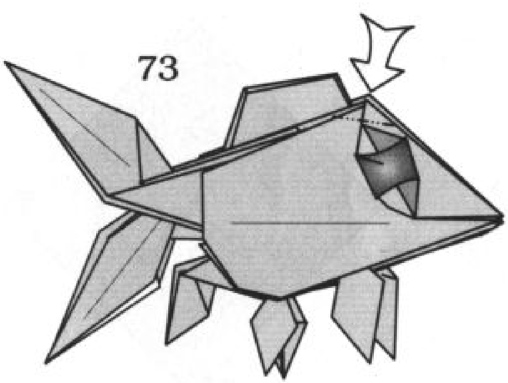
Repeat behind.

72



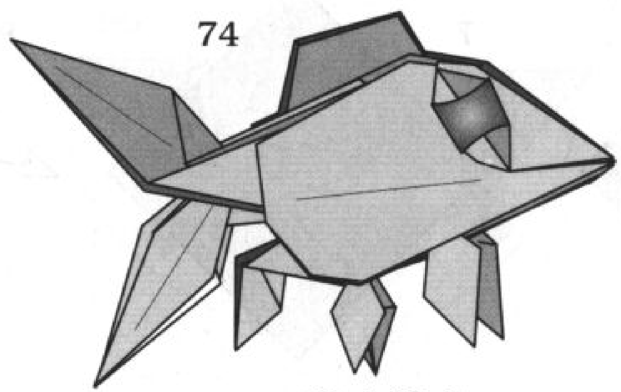
Spread-squash-fold to form a three-dimensional bulging eye. Repeat behind.

73



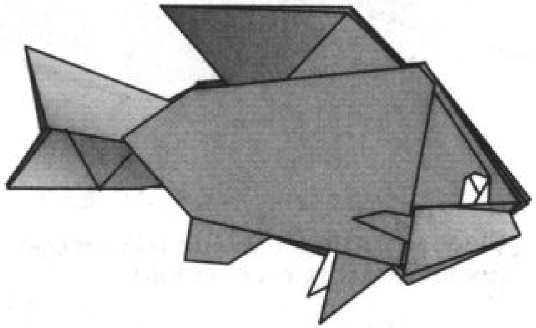
Reverse-fold at the top of the head. Repeat behind.

74



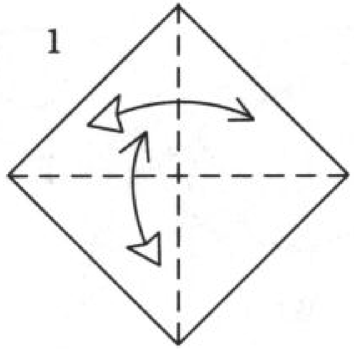
Goldfish

Cichlid



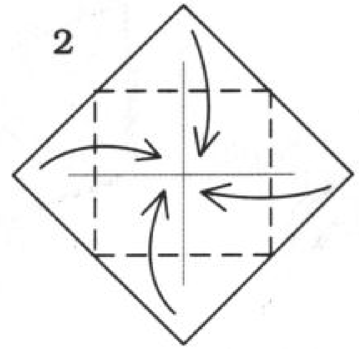
This family of fishes (family *Cichlidae*) is extremely diverse. One group of cichlids (pronounced 'SIK-lids') looks like a freshwater barracuda, while another is flat and disc shaped. They are small to medium in size and of all colors. They eat small marine animals. Many are found throughout Central and South America and Africa.

1

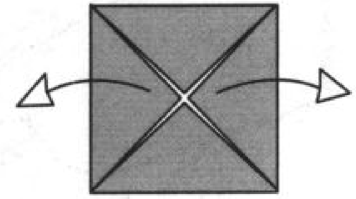


Fold and unfold.

2

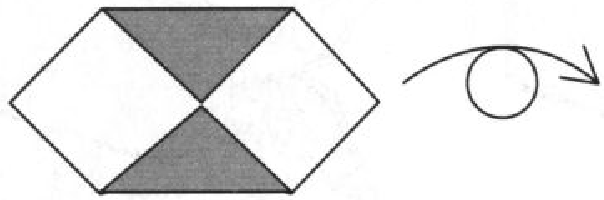


3

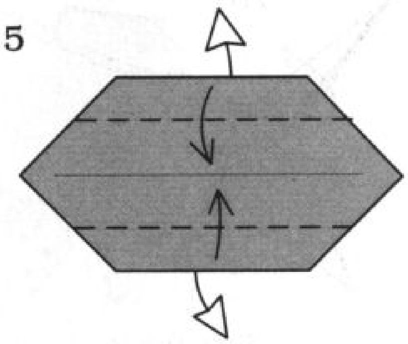


Unfold.

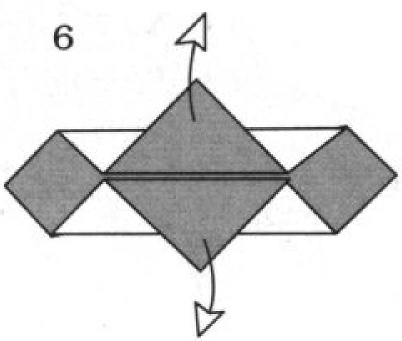
4



5

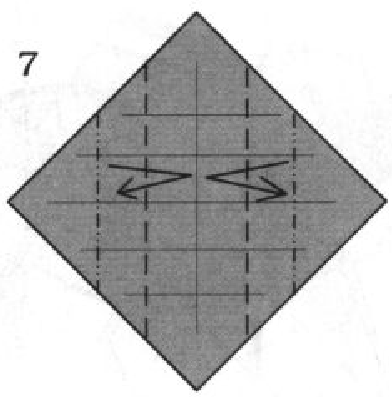


6

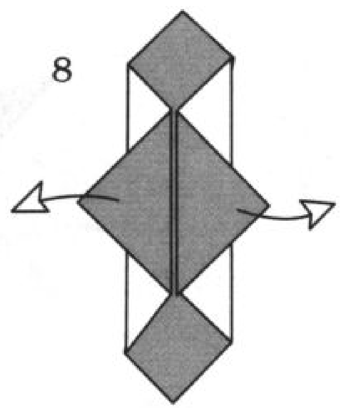


Unfold.

7

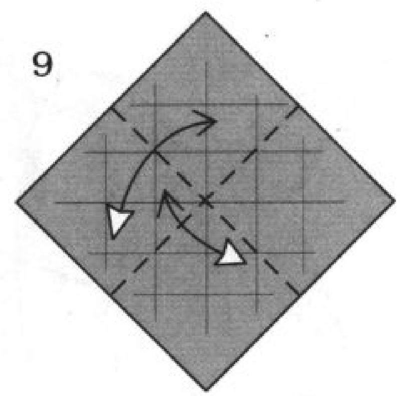


8



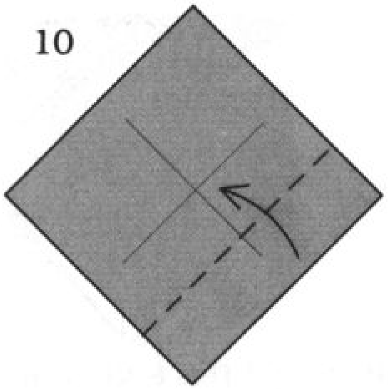
Unfold.

9

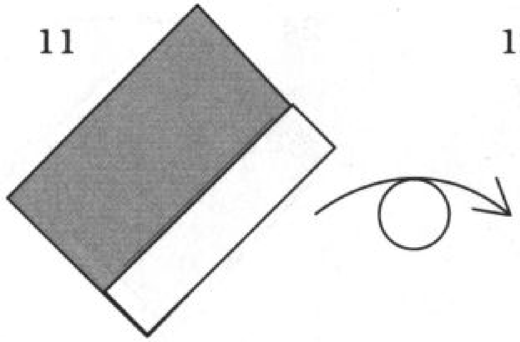


Fold and unfold.

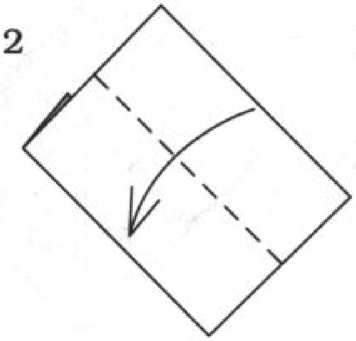
10



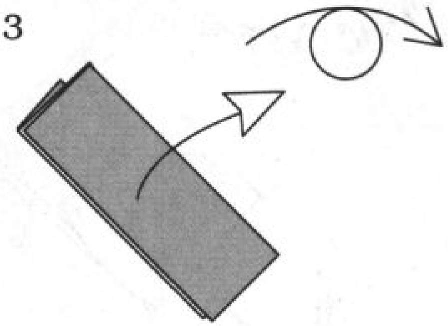
11



12

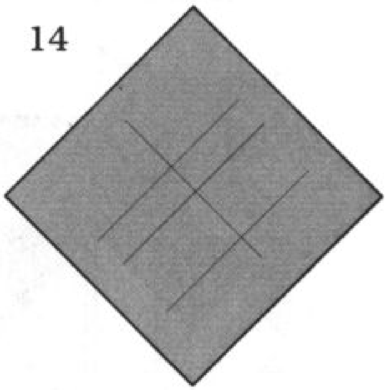


13



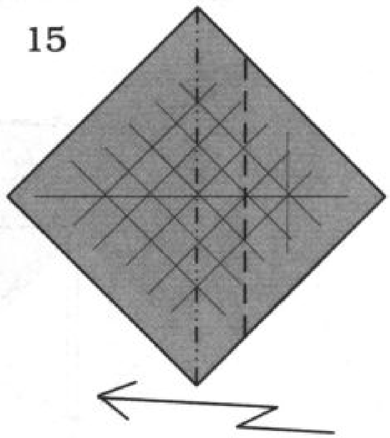
Unfold everything.

14

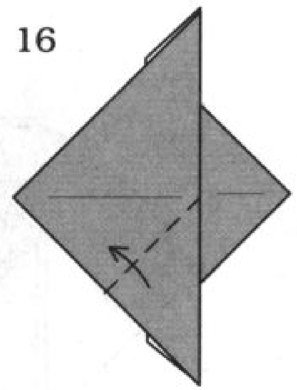


Repeat steps 10–13 on the remaining three sides.

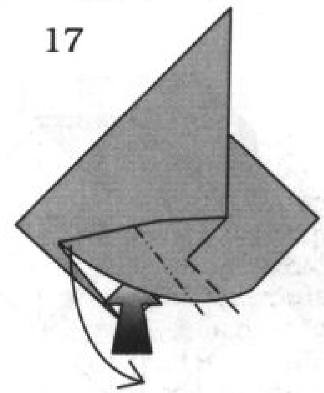
15



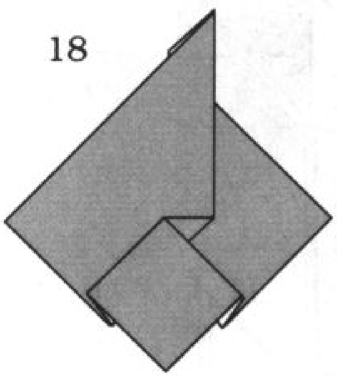
16



17

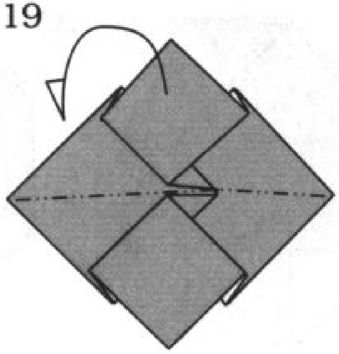


18

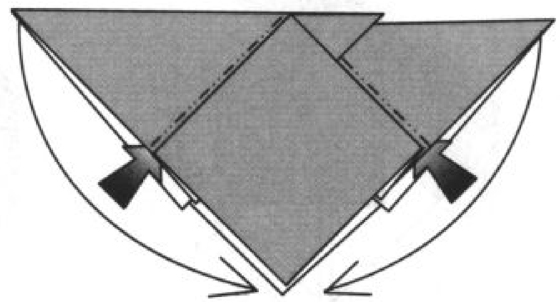


Repeat steps 16–17 on the top.

19

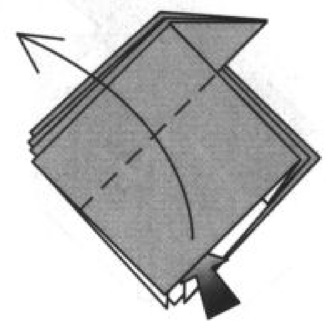


20

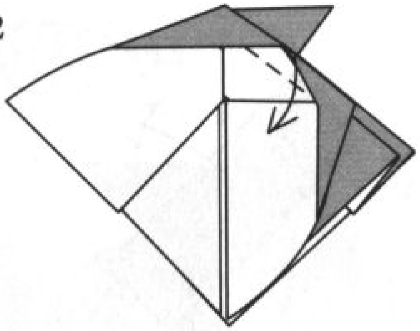


Make two reverse folds.

21

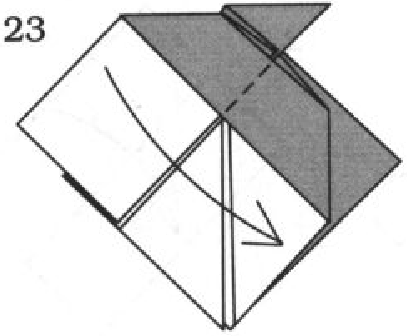


22

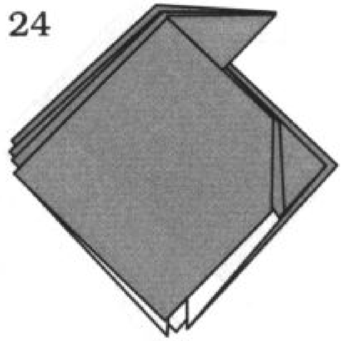


A three-dimensional intermediate step.

23

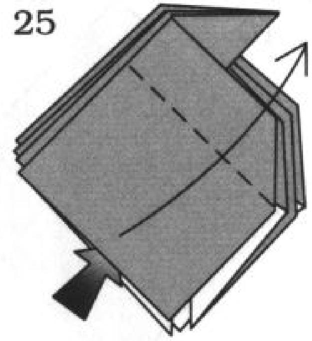


24



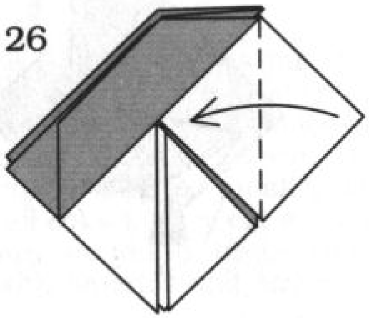
Repeat steps 21–23 behind in its mirror image.

25

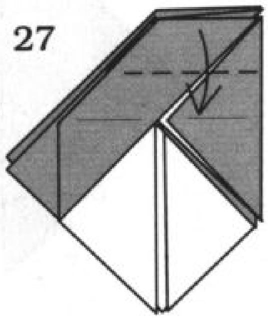


This is the same as steps 21–22.

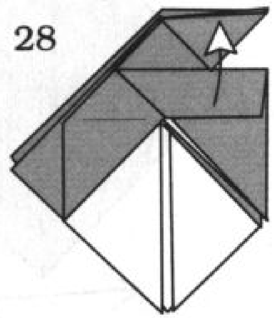
26



27

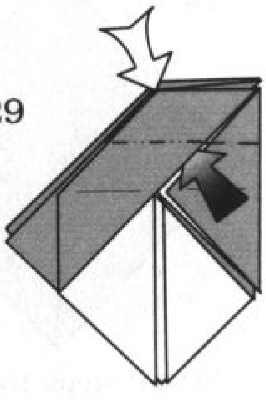


28



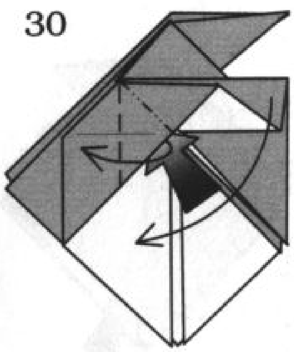
Unfold.

29

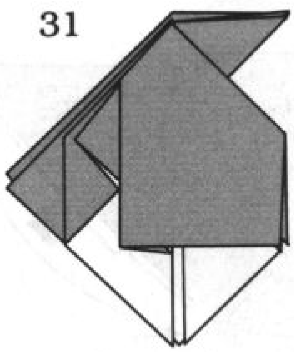


Sink.

30

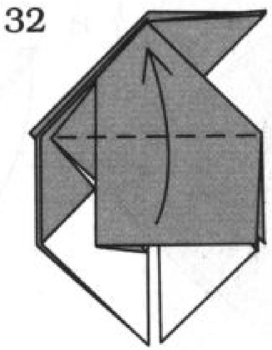


31

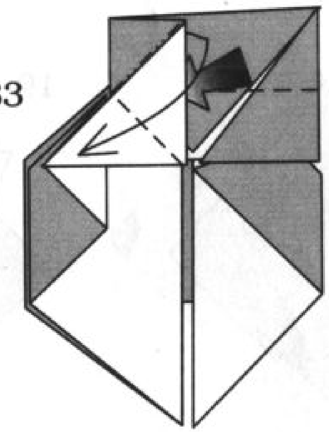


Repeat steps 25–30 behind.

32

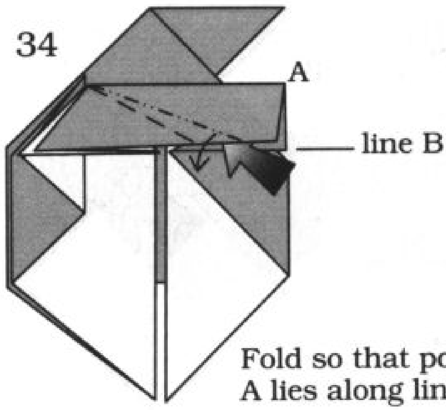


33



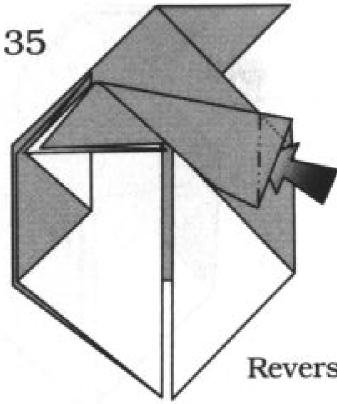
Squash-fold.

34



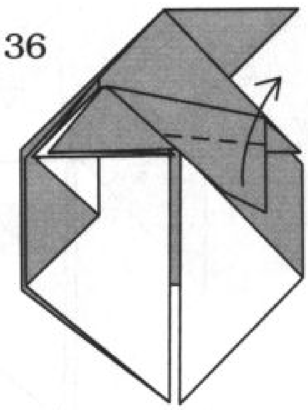
Fold so that point A lies along line B.

35

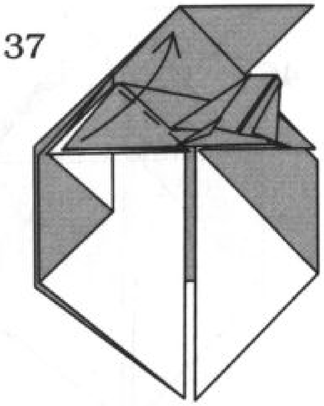


Reverse-fold.

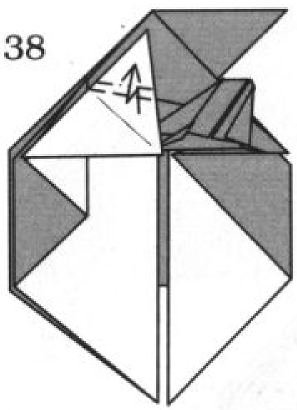
36



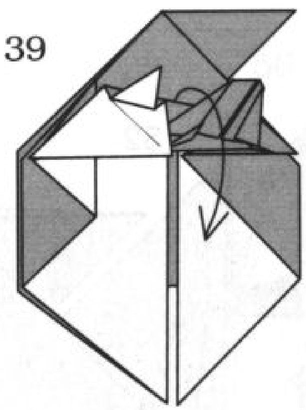
37



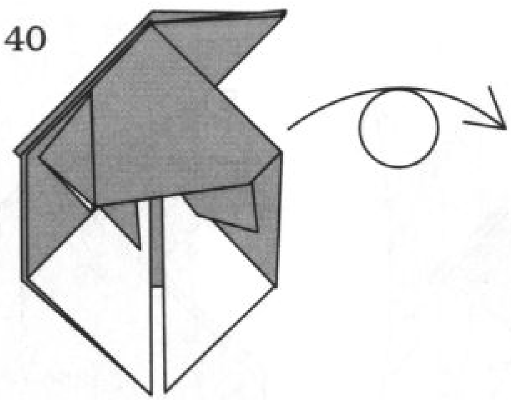
38



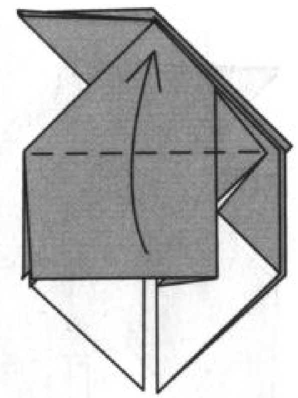
39



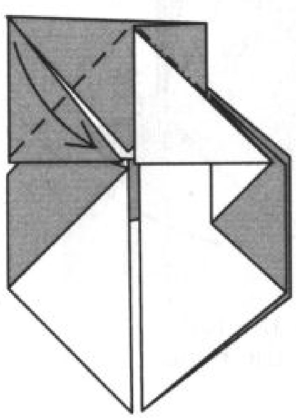
40



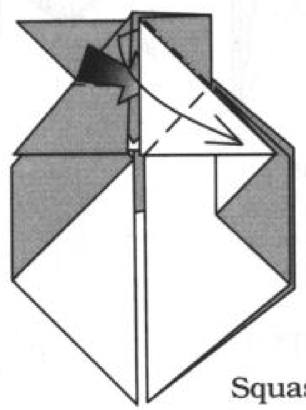
41



42

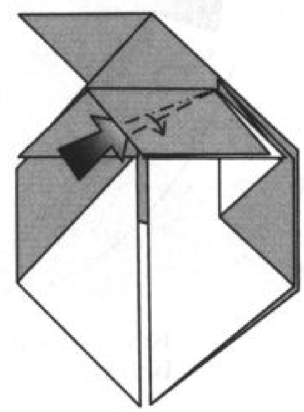


43

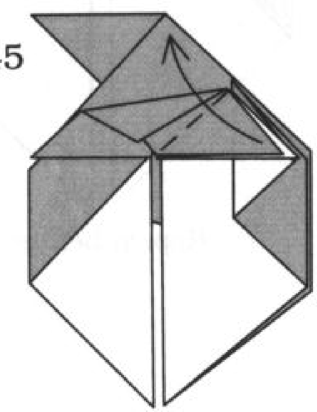


Squash-fold.

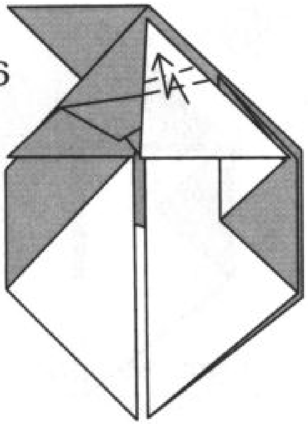
44



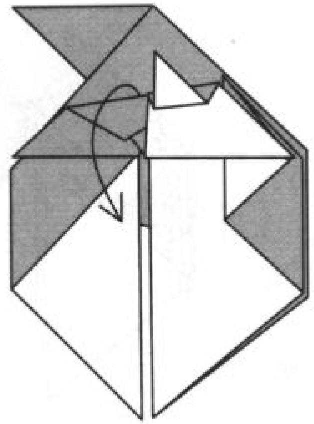
45



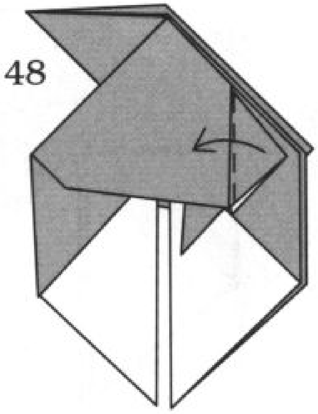
46



47

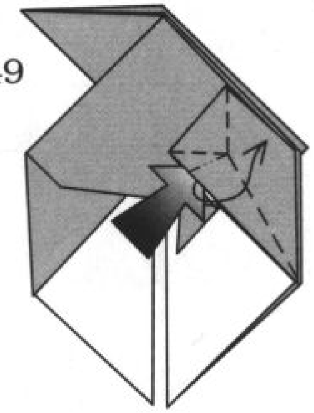


48



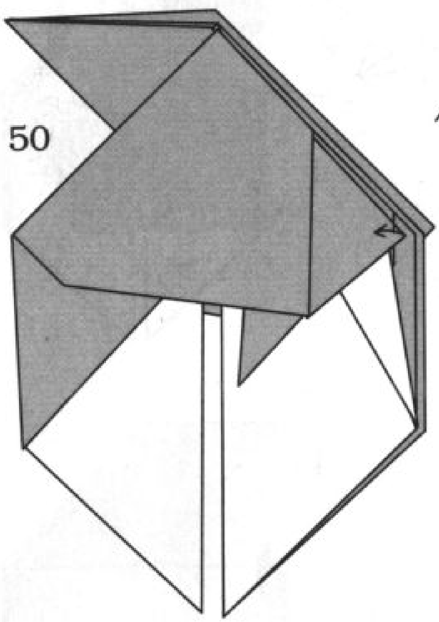
Repeat behind.

49



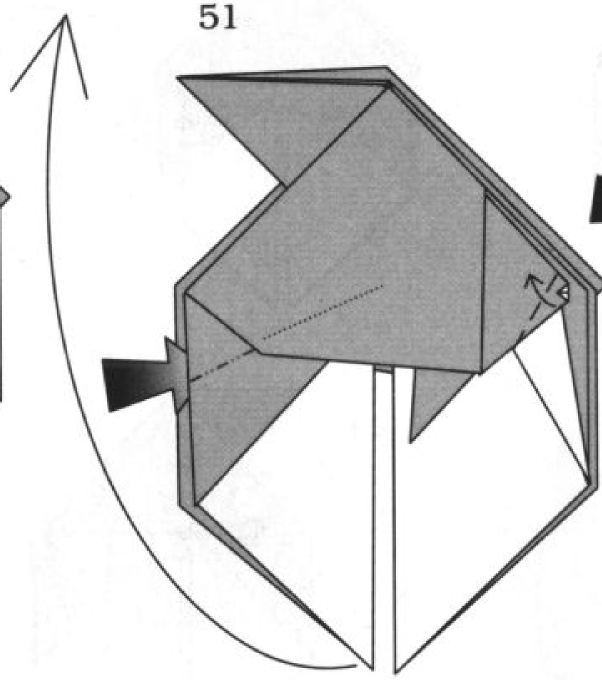
Repeat behind.

50



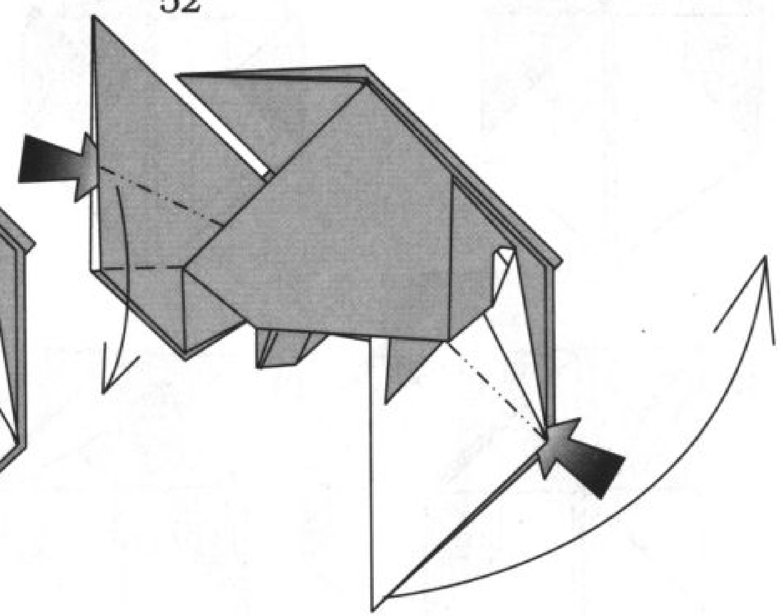
Repeat behind.

51



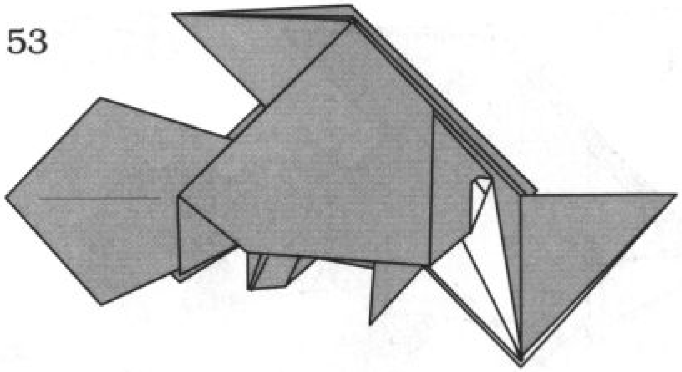
Reverse-fold at the tail. Repeat behind to form the eyes.

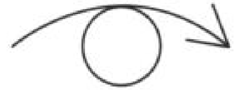
52



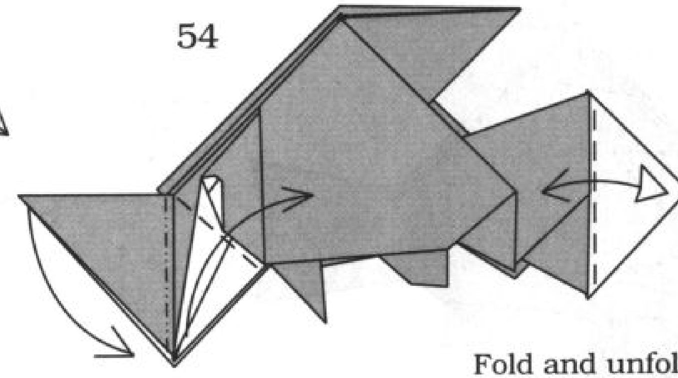
Squash-fold by the tail. Reverse-fold at the head.

53





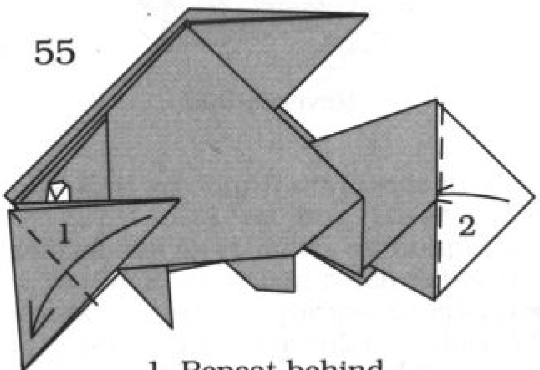
54



Repeat behind.

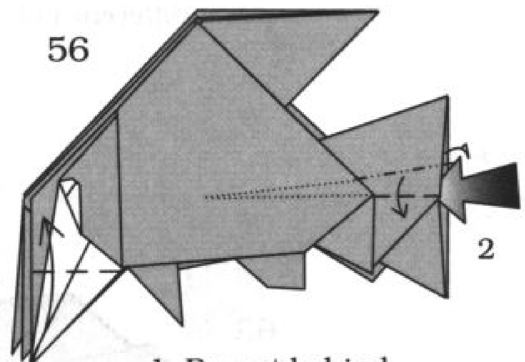
Fold and unfold.

55



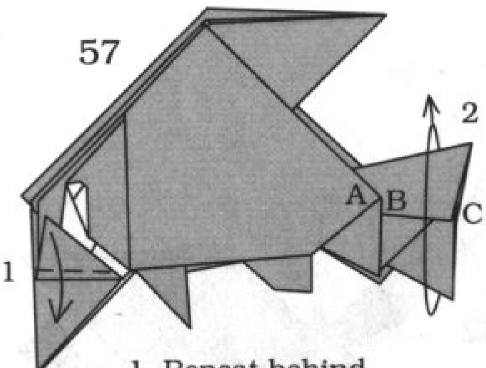
1. Repeat behind.
2. Tuck inside.

56



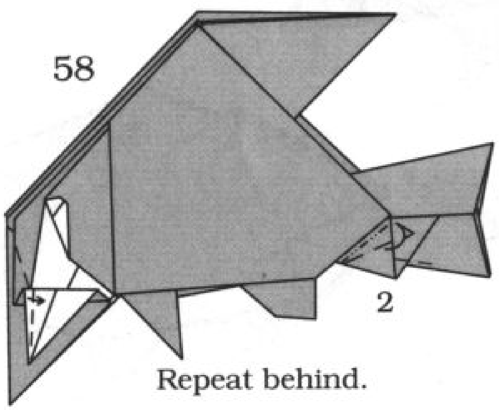
1. Repeat behind.
2. Crimp-fold the tail.

57



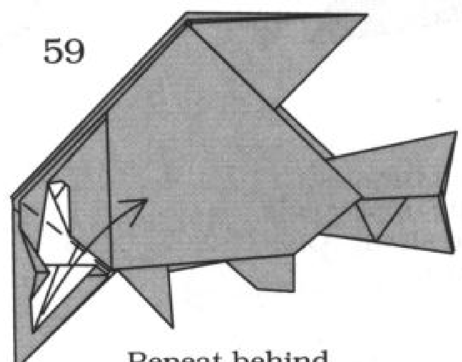
1. Repeat behind.
2. Slide the tail up so line B–C meets point A.

58



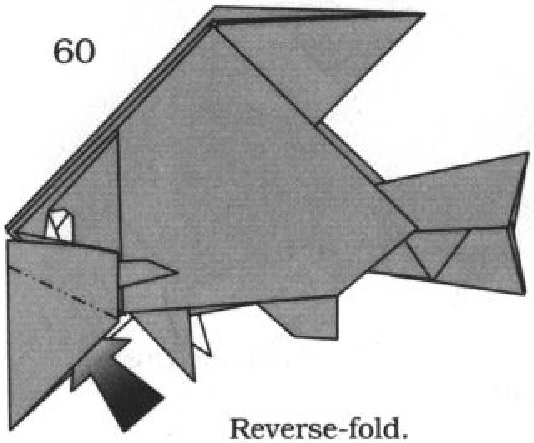
Repeat behind.

59



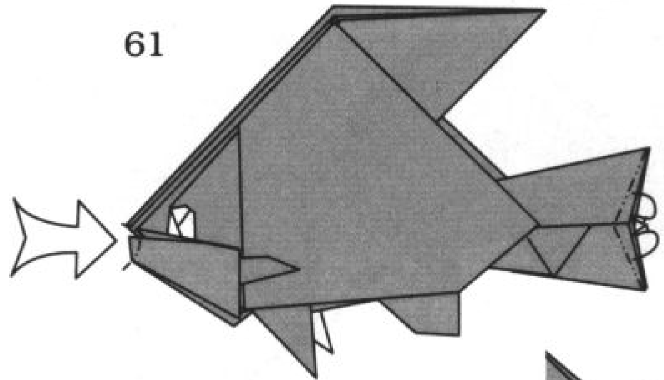
Repeat behind.

60

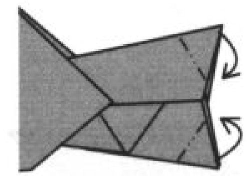


Reverse-fold.

61

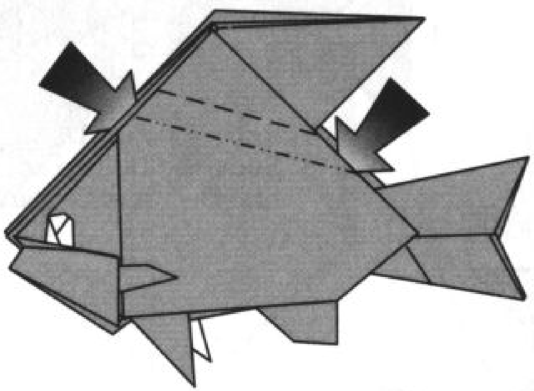


Shape the mouth and tail. Here are two different tail shapes.



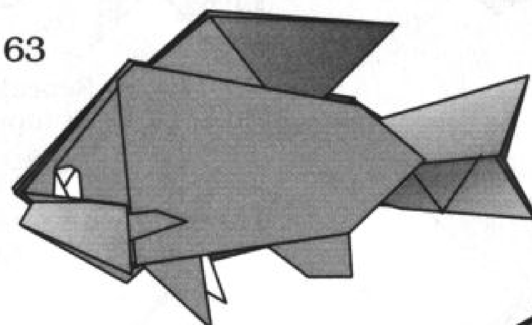
Reverse-folds.

62

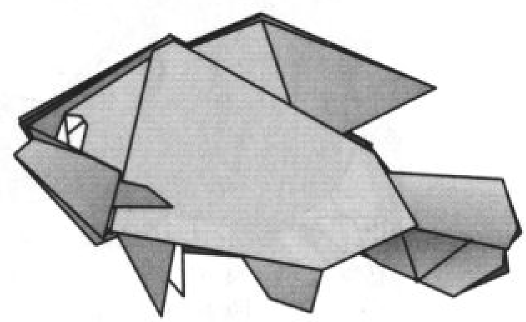


This fold is a cross between the sink and crimp fold. It forms the upper body and dorsal fin. Do this fold slowly. Only one of the two tails is drawn.

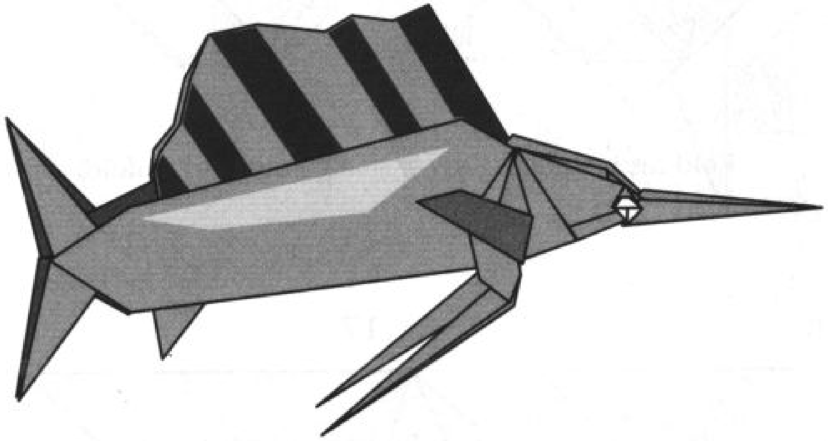
63



Cichlid

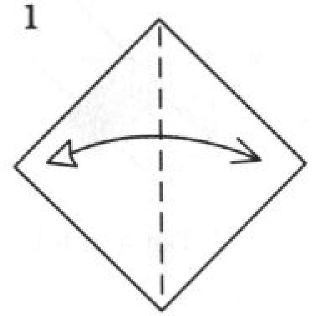


Sailfish



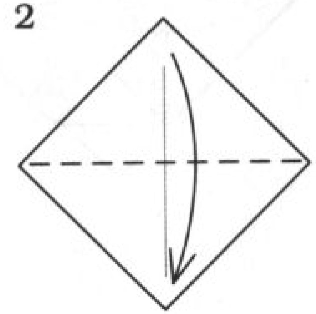
These fish are found worldwide in open oceans. They are 4 to 12 feet long. These agile fish can swim as fast as 60 miles an hour. Though they are toothless, they can catch fish with their swords. Hunting in groups, sailfish (*Istiophorus platypterus*) use their enlarged dorsal fins to trap smaller fish.

1

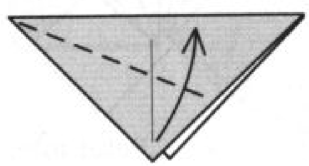


Fold and unfold.

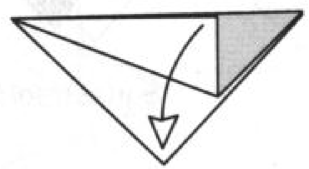
2



3

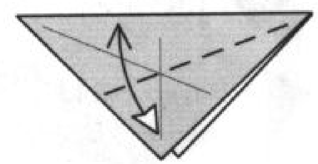


4



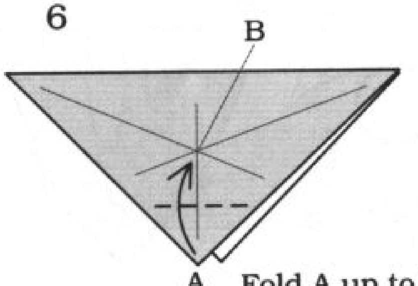
Unfold.

5



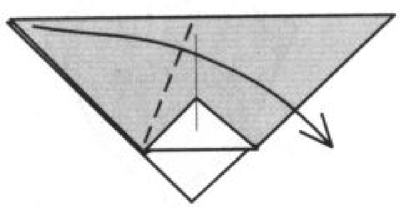
Fold and unfold.

6

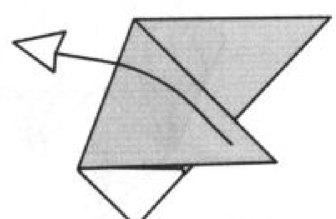


Fold A up to B.

7

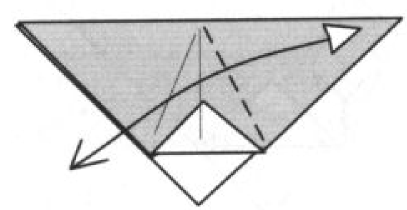


8



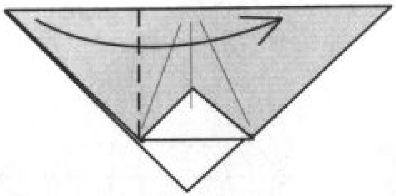
Unfold.

9

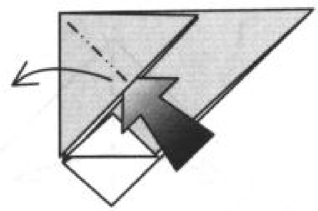


Fold and unfold.

10

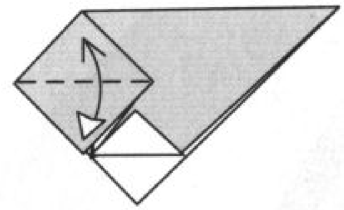


11



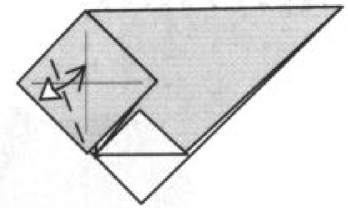
Squash-fold.

12



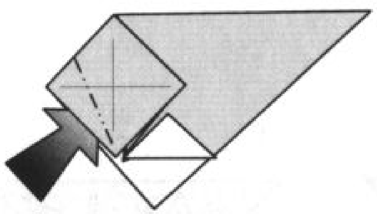
Fold and unfold.

13



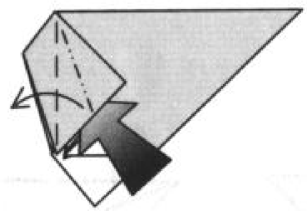
Fold and unfold.

14



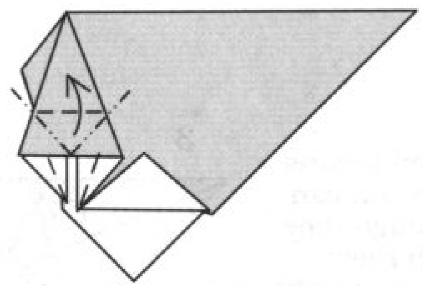
Reverse-fold.

15



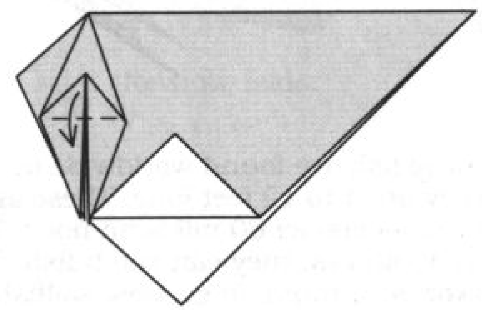
Squash-fold.

16

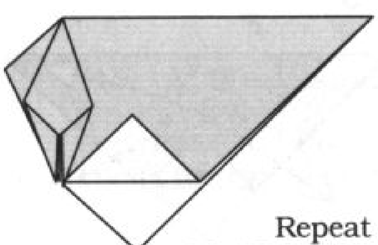


Petal-fold.

17

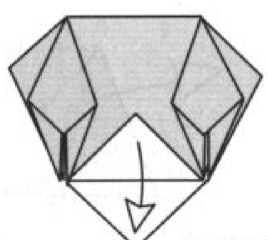


18



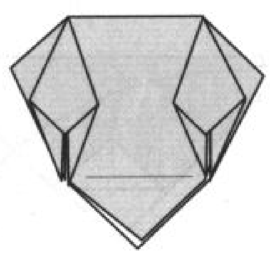
Repeat steps 10–17 on the right.

19

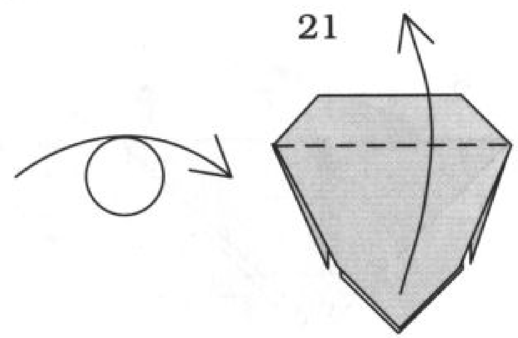


Unfold.

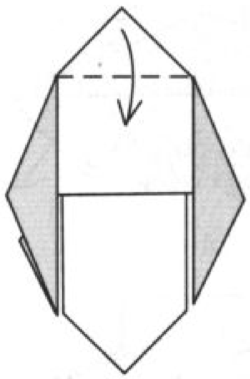
20



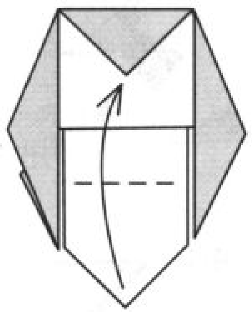
21



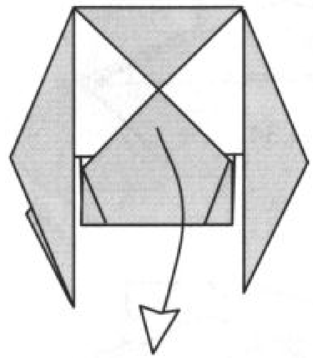
22



23

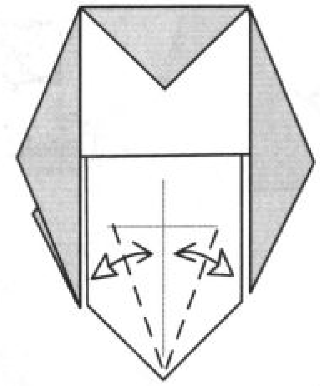


24



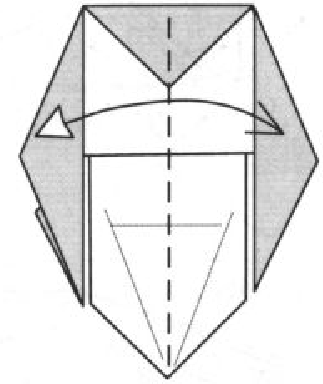
Unfold.

25



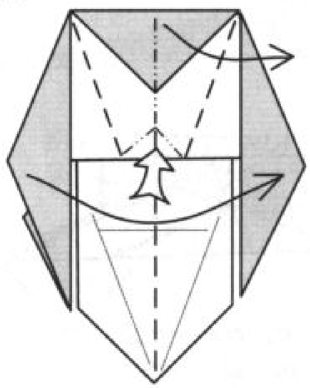
Fold and unfold.

26



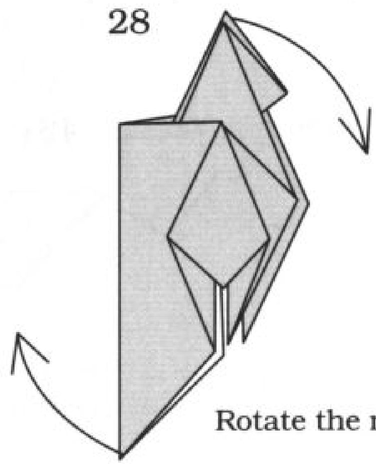
Fold and unfold.

27



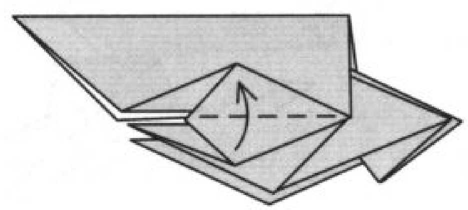
Push the center in to form a little diamond while folding in half.

28



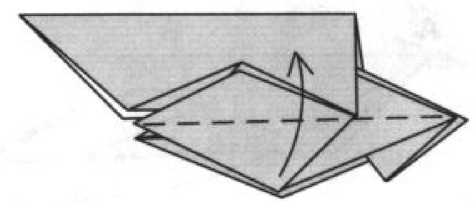
Rotate the model.

29



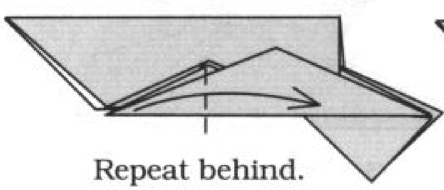
Repeat behind.

30



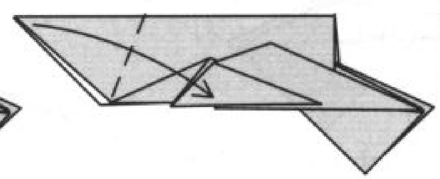
Repeat behind.

31

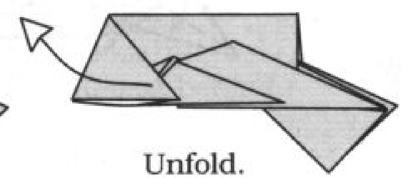


Repeat behind.

32

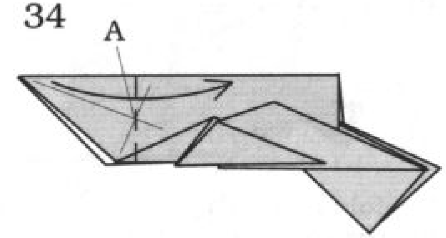


33



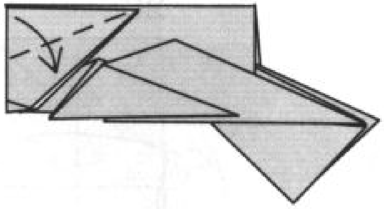
Unfold.

34

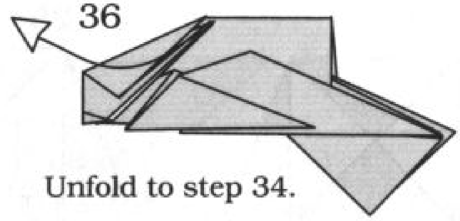


Use point A as a guide.

35

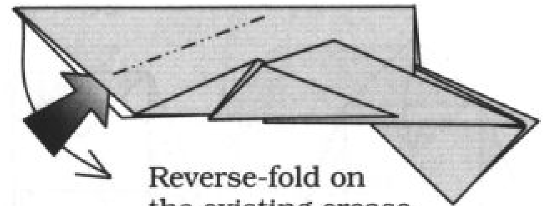


36



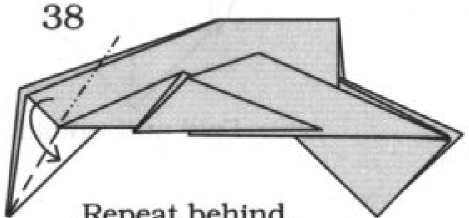
Unfold to step 34.

37



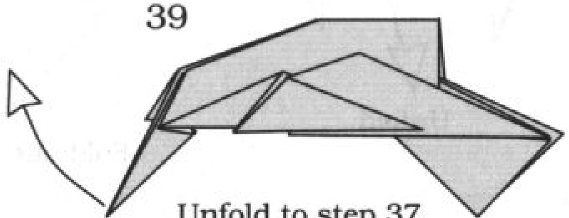
Reverse-fold on the existing crease.

38



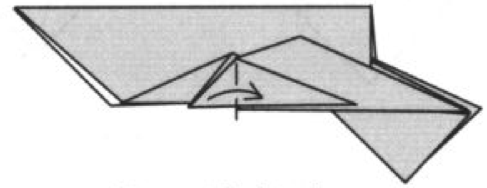
Repeat behind.

39



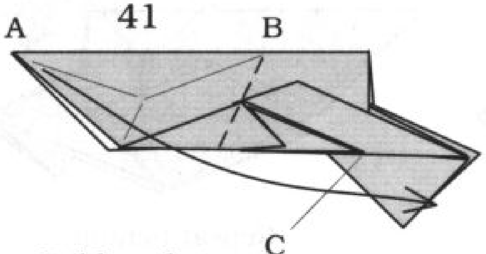
Unfold to step 37.

40



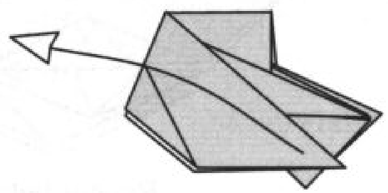
Repeat behind.

41



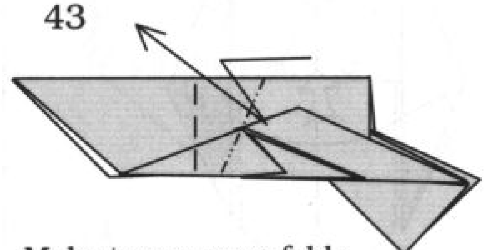
Fold so that some point along the line A–B touches point C.

42



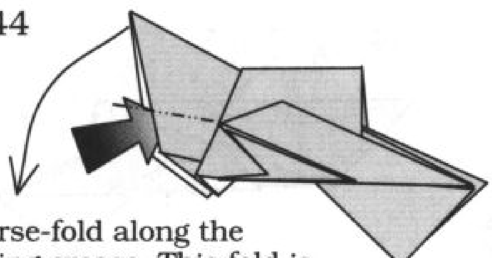
Unfold.

43



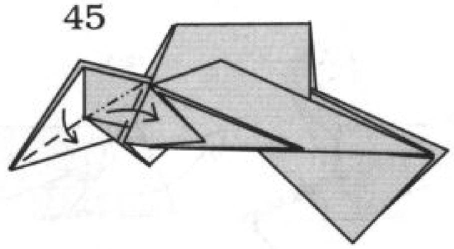
Make two reverse-folds along existing creases.

44



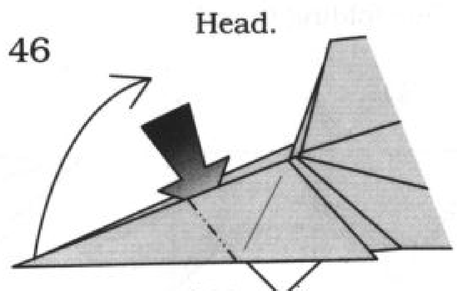
Reverse-fold along the existing crease. This fold is similar to the one in step 27.

45



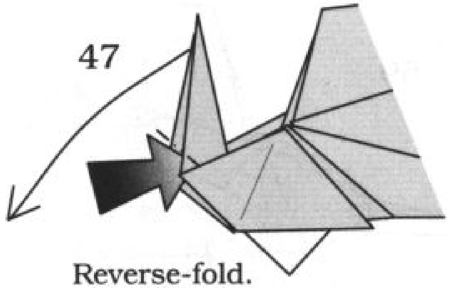
Squash-fold. Repeat behind.

46



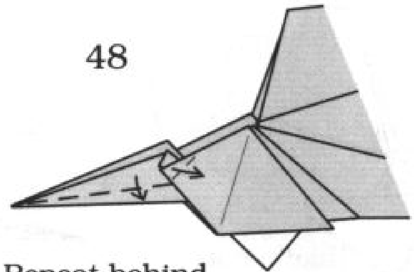
Reverse-fold.

47



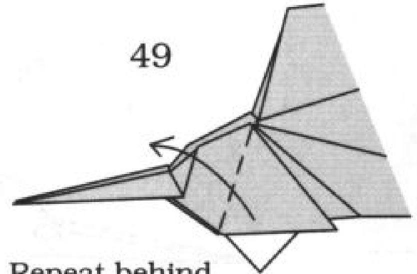
Reverse-fold.

48



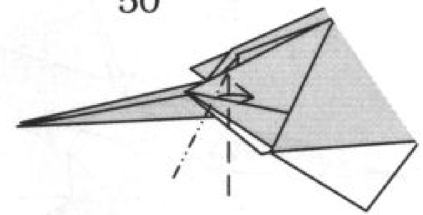
Repeat behind.

49



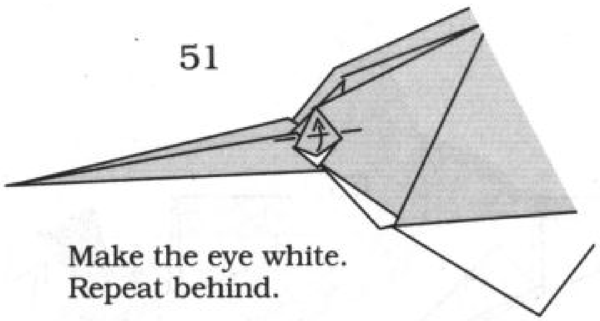
Repeat behind.

50



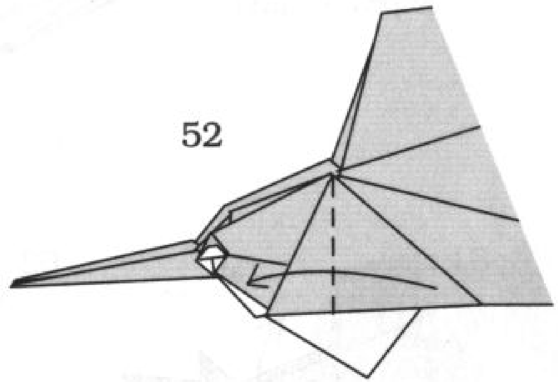
Squash-fold to form the eye. Repeat behind.

51



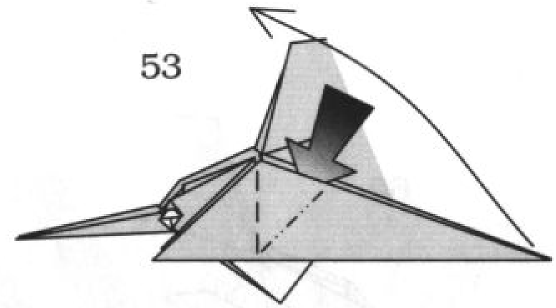
Make the eye white.
Repeat behind.

52



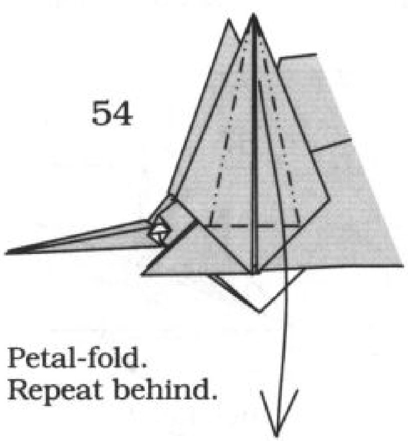
Repeat behind.

53



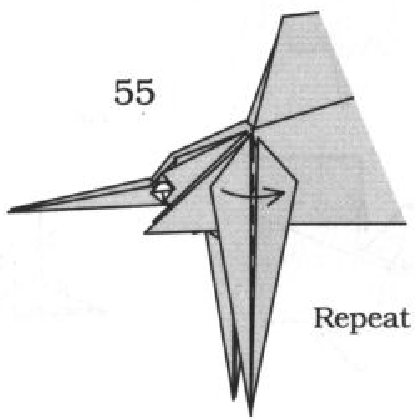
Squash-fold. Repeat behind.

54



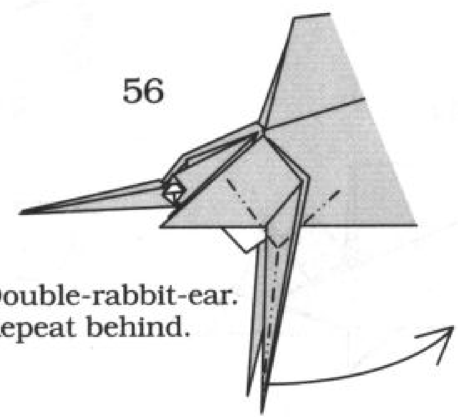
Petal-fold.
Repeat behind.

55



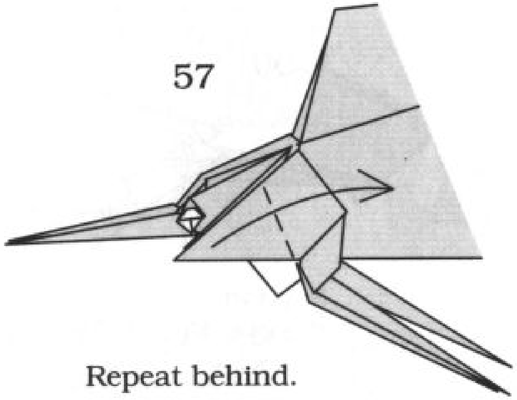
Repeat behind.

56



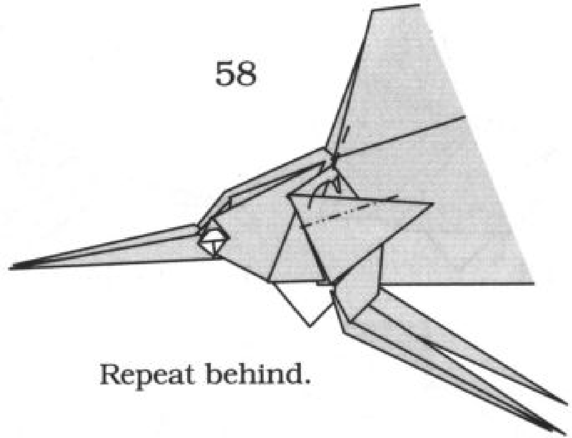
Double-rabbit-ear.
Repeat behind.

57



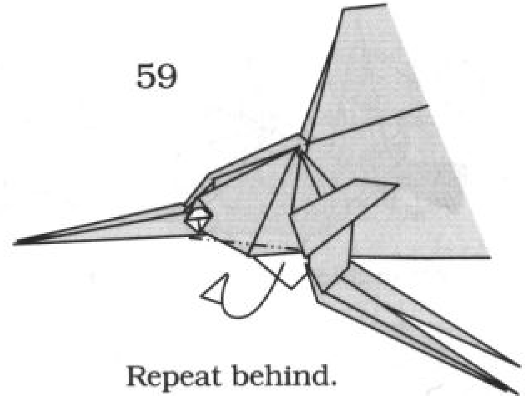
Repeat behind.

58



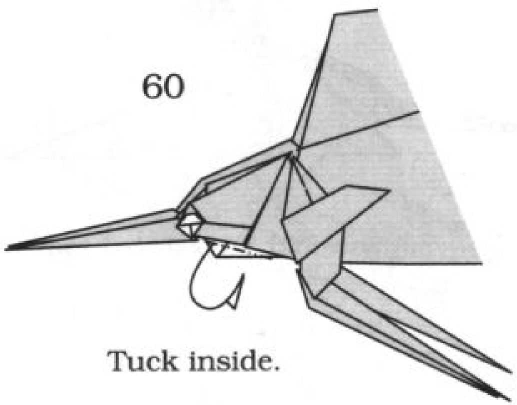
Repeat behind.

59



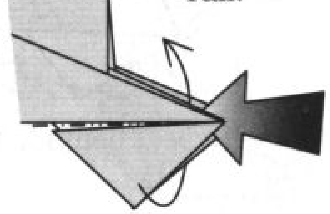
Repeat behind.

60



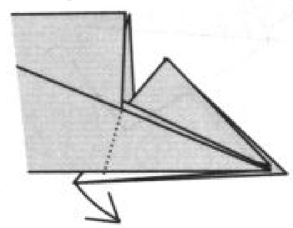
Tuck inside.

61



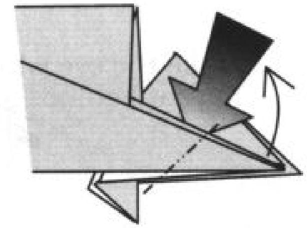
Reverse-fold.

62



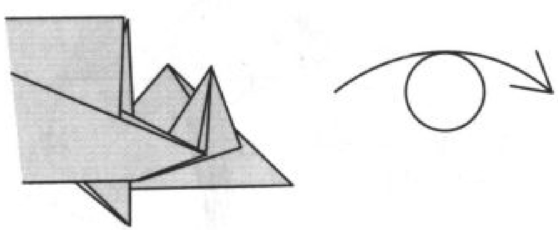
Reverse-fold on the x-ray line.

63

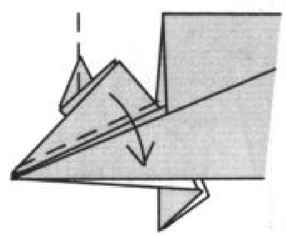


Reverse-fold.

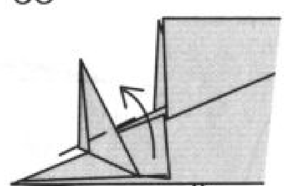
64



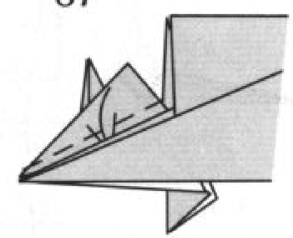
65



66

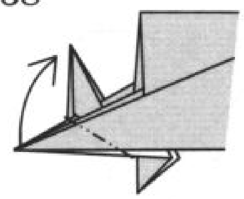


67



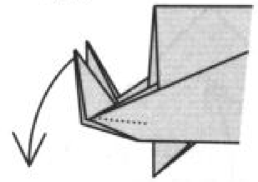
Tuck inside.

68



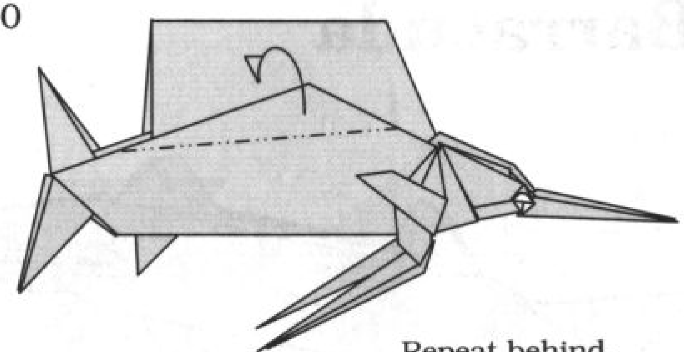
Reverse-fold.

69



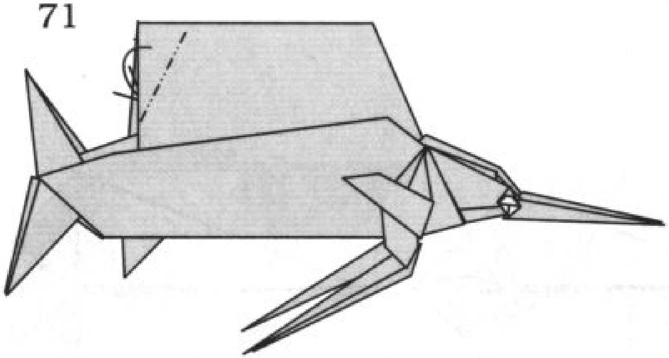
Reverse-fold on the x-ray line.

70



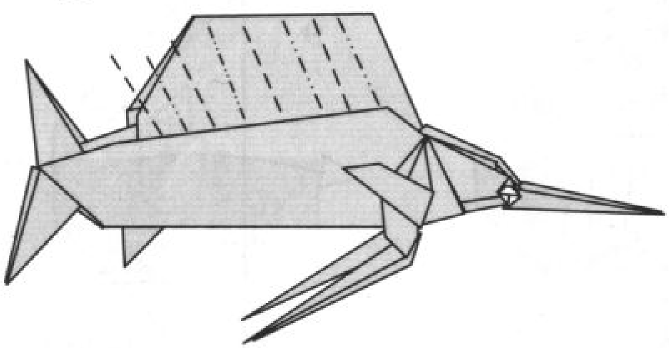
Repeat behind.

71



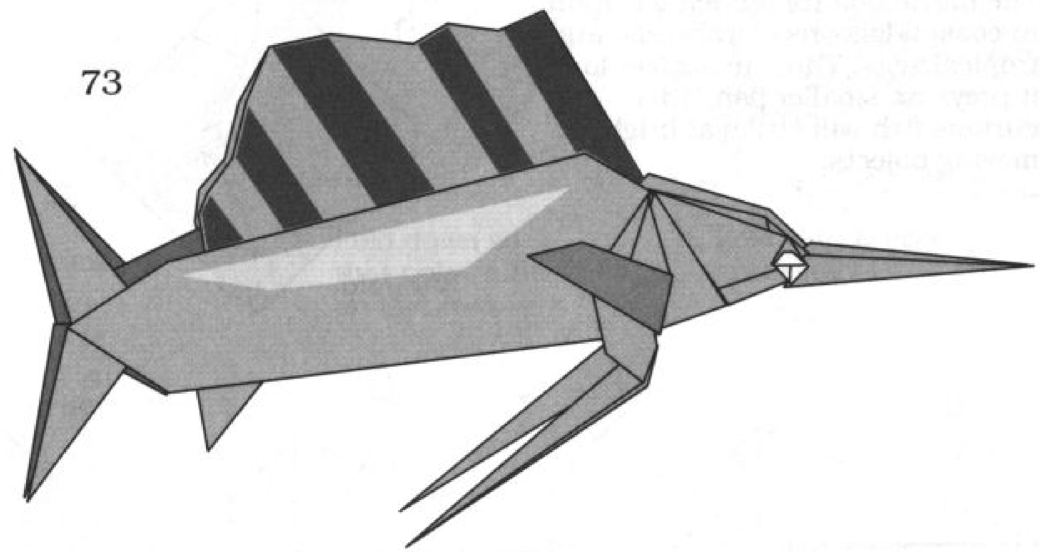
Reverse-fold.

72



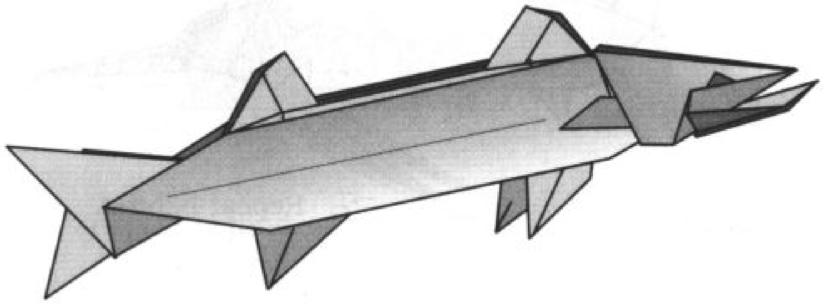
Pleat the dorsal fin.

73



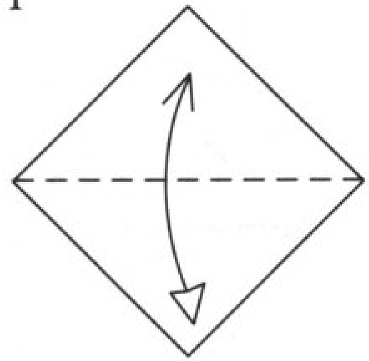
Sailfish

Barracuda



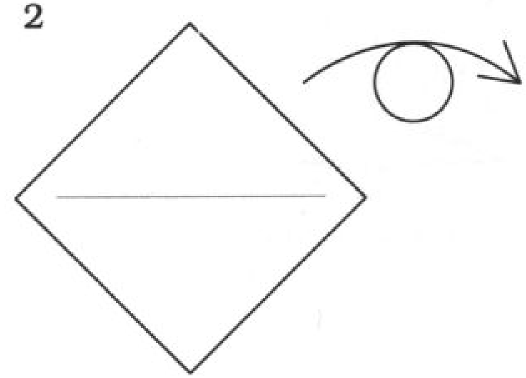
The barracuda (*Sphyraena*) is found in coastal lagoons, coral reefs, and tropical seas. Three to six feet long, it preys on smaller fish. This curious fish will strike at bright or moving objects.

1

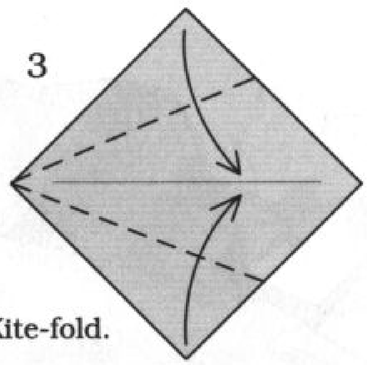


Fold up and unfold.

2

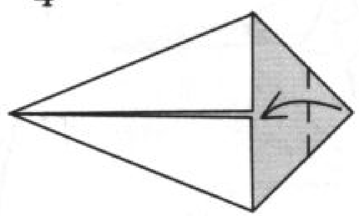


3

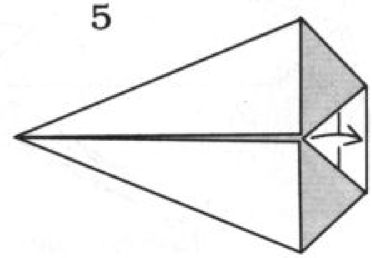


Kite-fold.

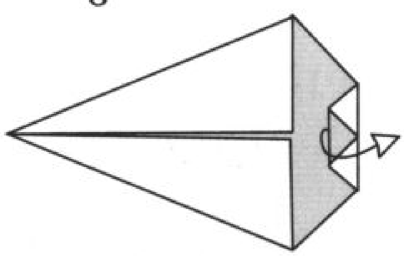
4



5

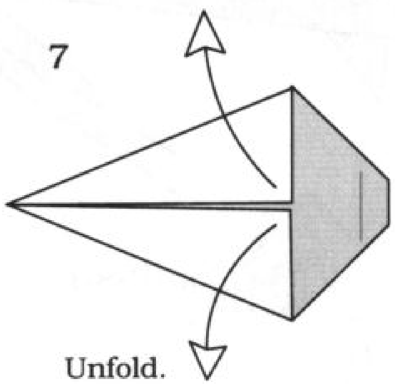


6



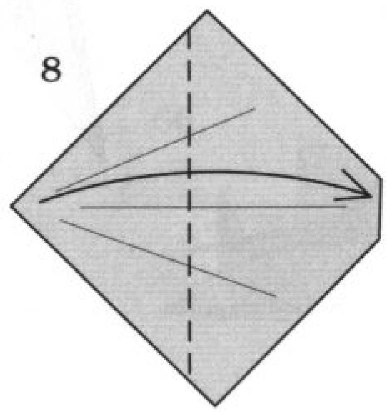
Unfold.

7

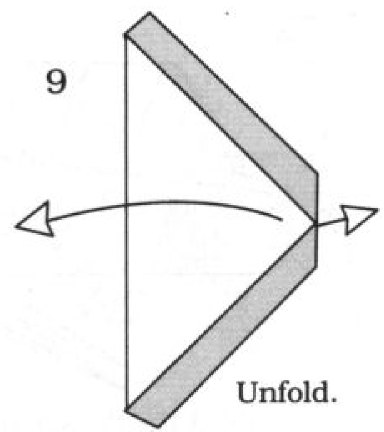


Unfold.

8

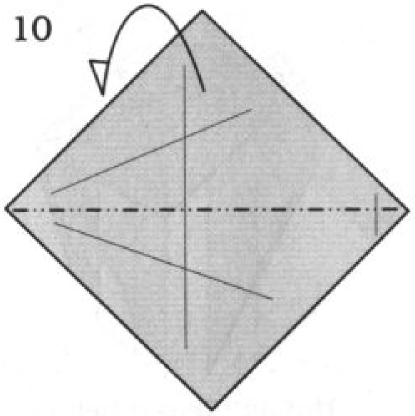


9

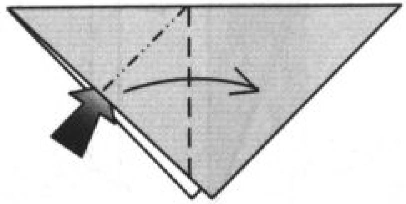


Unfold.

10

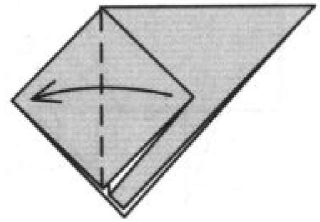


11

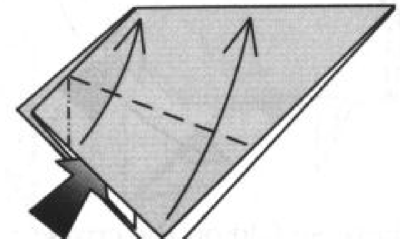


Squash-fold on the existing crease.

12

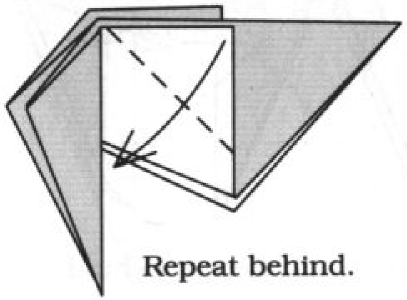


13



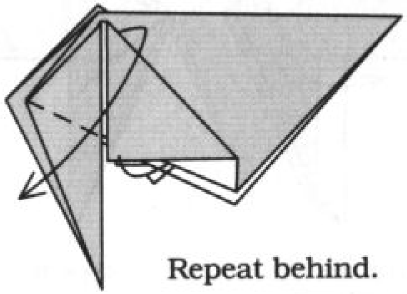
Squash-fold. Repeat behind.

14



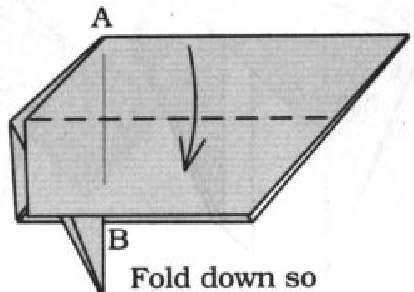
Repeat behind.

15



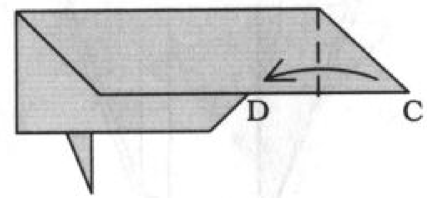
Repeat behind.

16



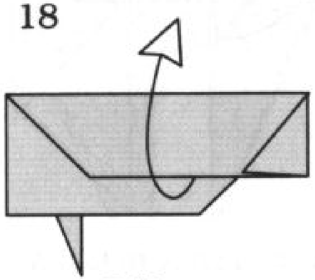
Fold down so that point A lies on line A–B.

17



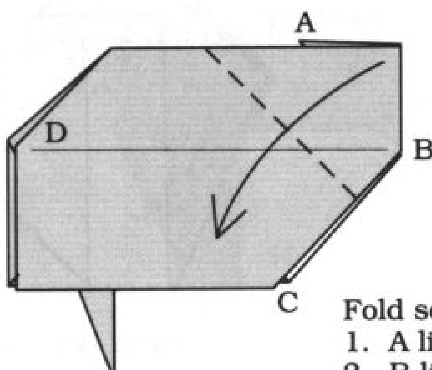
Fold C to D very accurately.

18



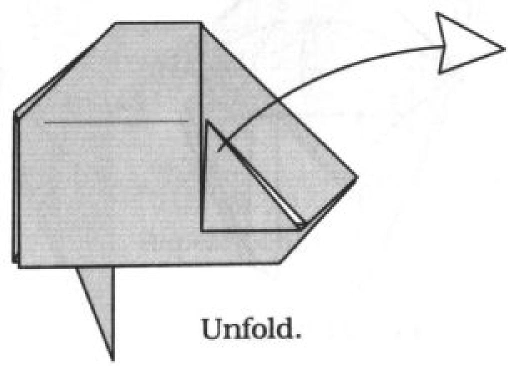
Fold up.

19



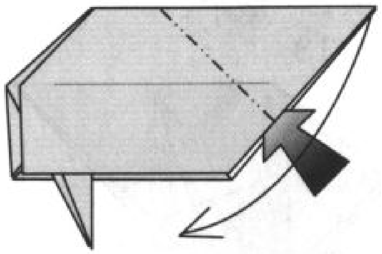
Fold so that
1. A lies on line D–B and
2. B lies on line B–C.

20



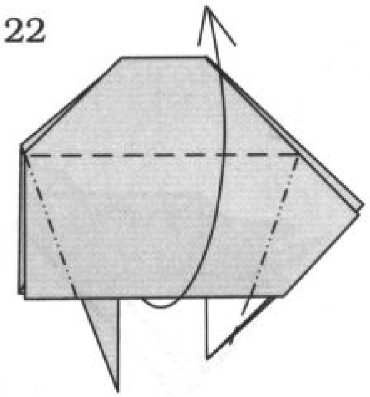
Unfold.

21



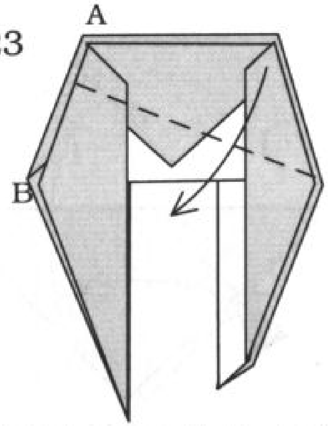
Reverse-fold on the crease.

22



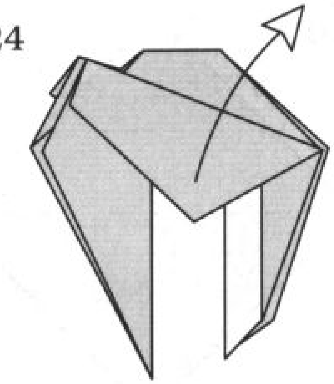
Petal-fold. Repeat behind.

23



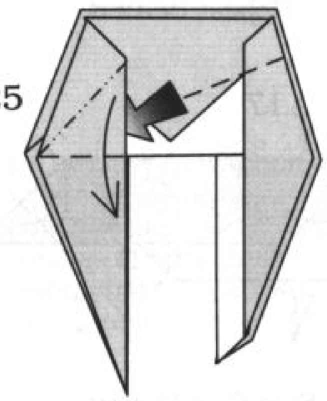
Fold down so that point A lies on the line A–B. Repeat behind.

24



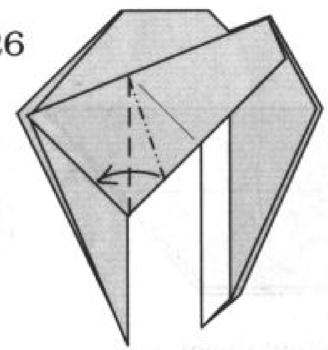
Unfold. Repeat behind.

25



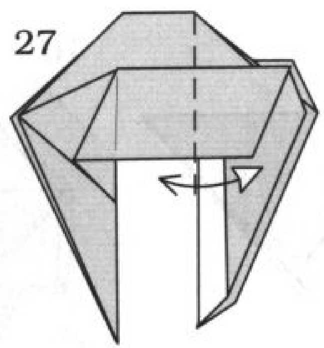
Squash-fold. Repeat behind.

26



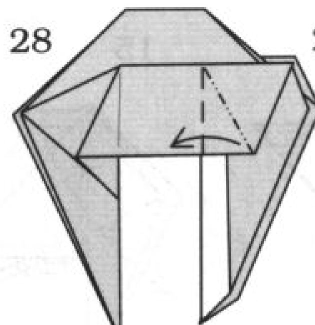
Repeat behind.

27



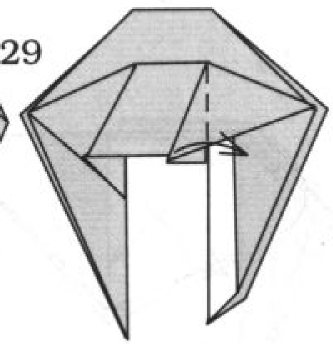
Fold and unfold. Repeat behind.

28



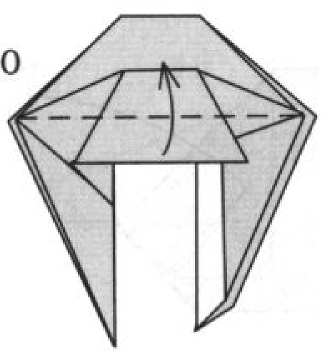
Repeat behind.

29



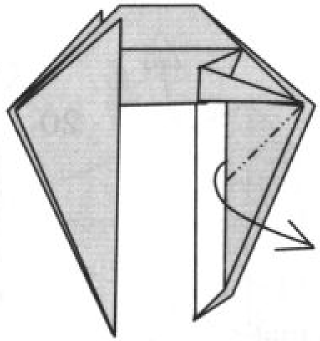
Repeat behind.

30



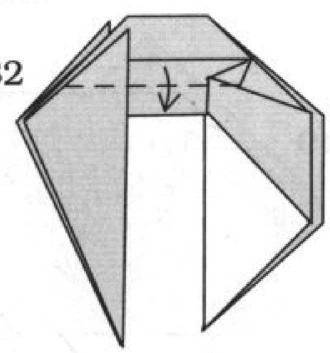
Repeat behind.

31



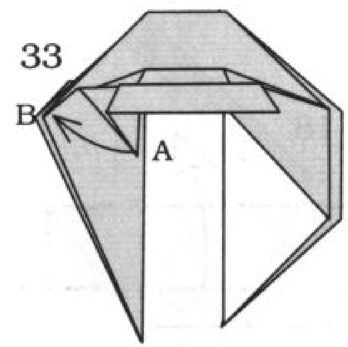
Pull some paper out. Repeat behind.

32



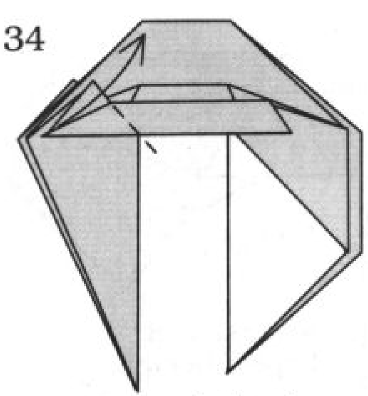
Repeat behind.

33



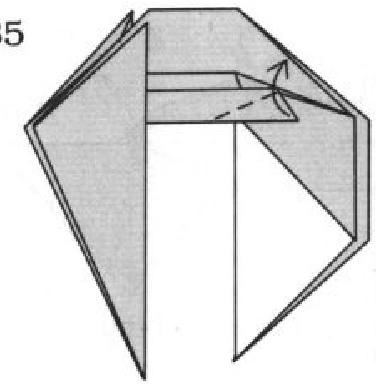
Open slightly to fold A to B. Repeat behind.

34



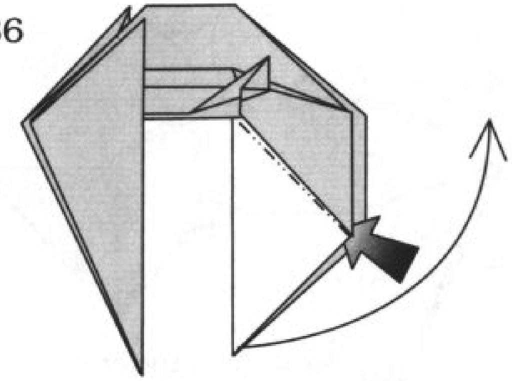
Repeat behind.

35



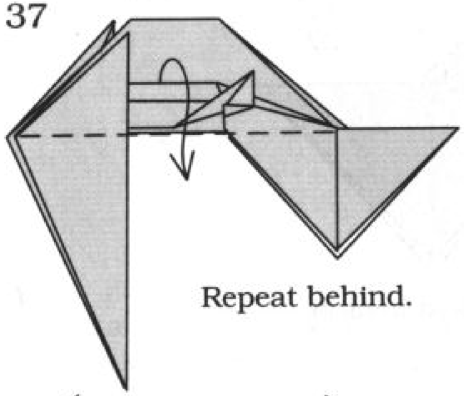
Do not repeat behind.

36



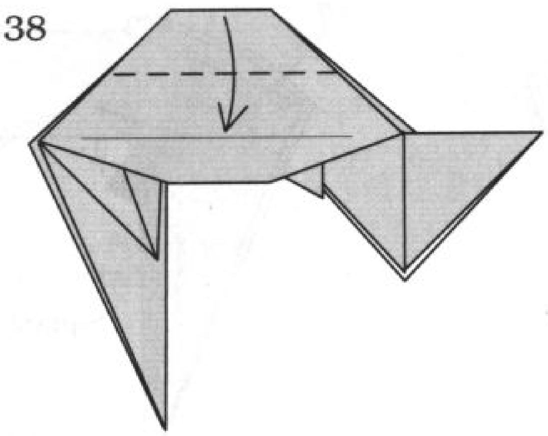
Reverse-fold.

37

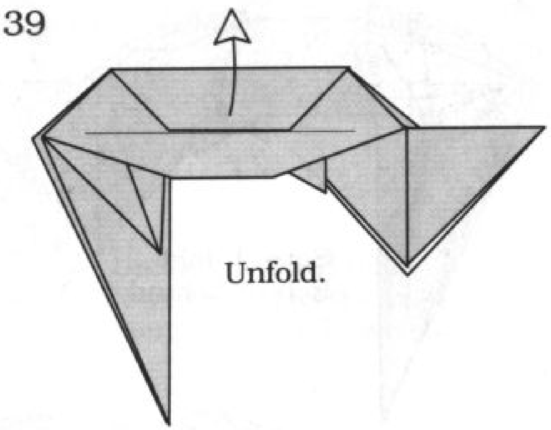


Repeat behind.

38

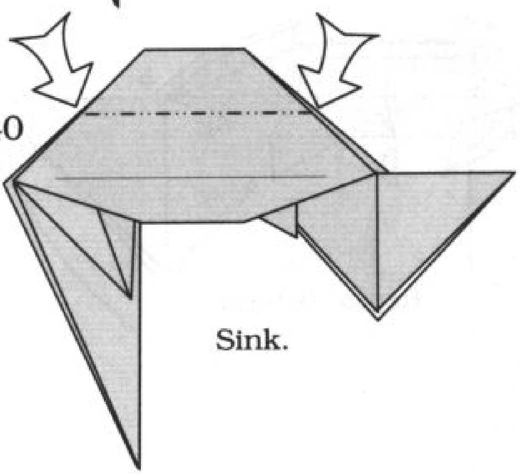


39



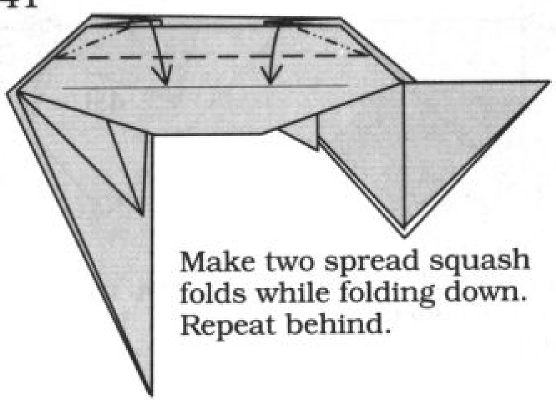
Unfold.

40



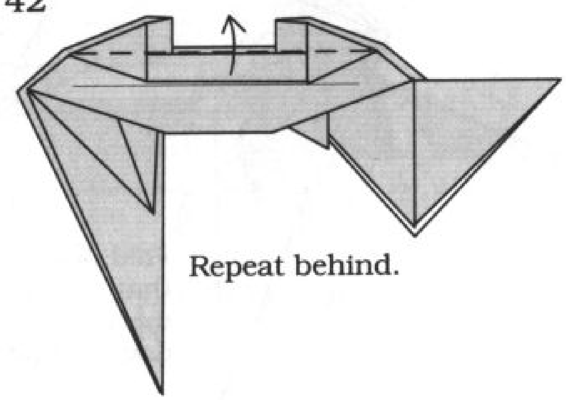
Sink.

41



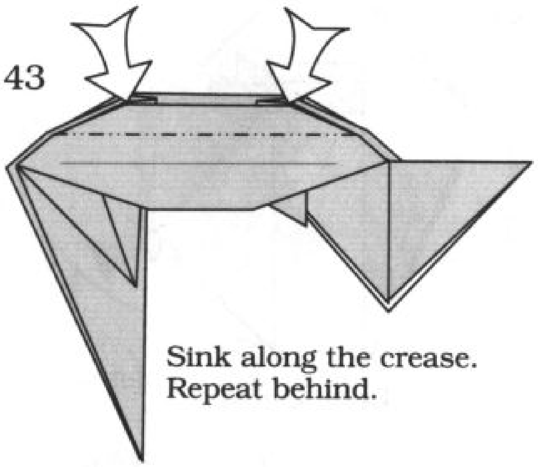
Make two spread squash folds while folding down. Repeat behind.

42



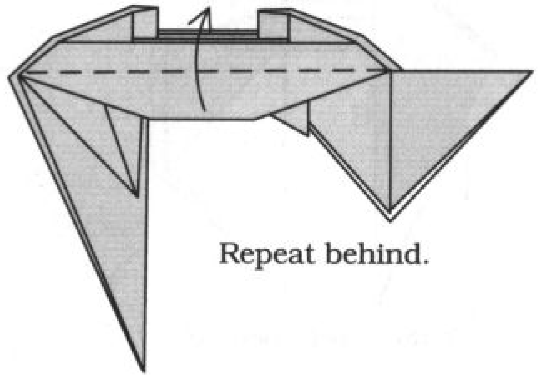
Repeat behind.

43



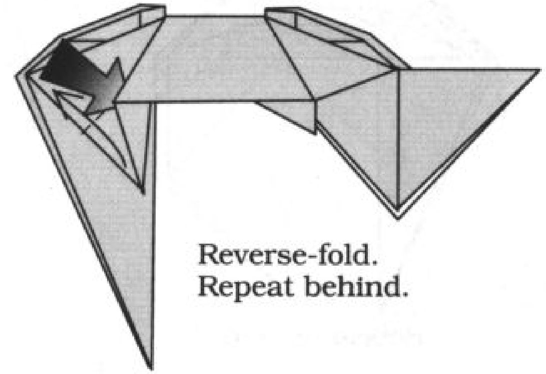
Sink along the crease.
Repeat behind.

44



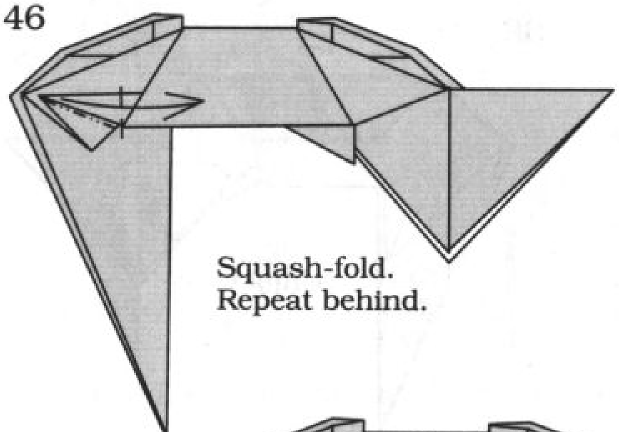
Repeat behind.

45



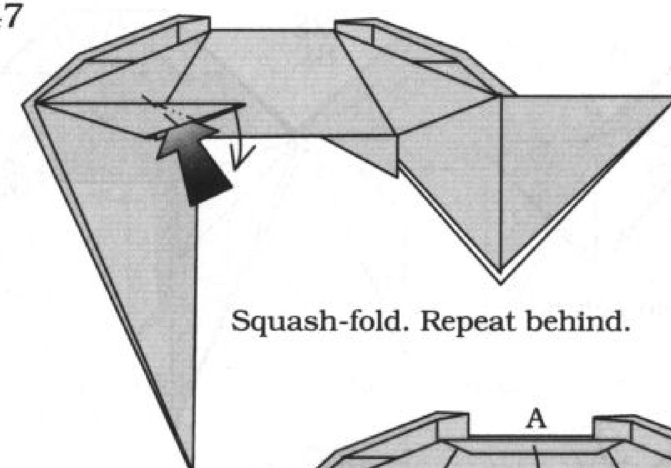
Reverse-fold.
Repeat behind.

46



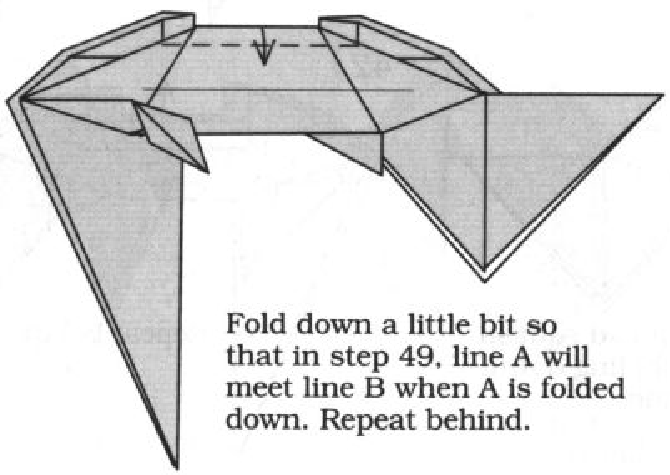
Squash-fold.
Repeat behind.

47



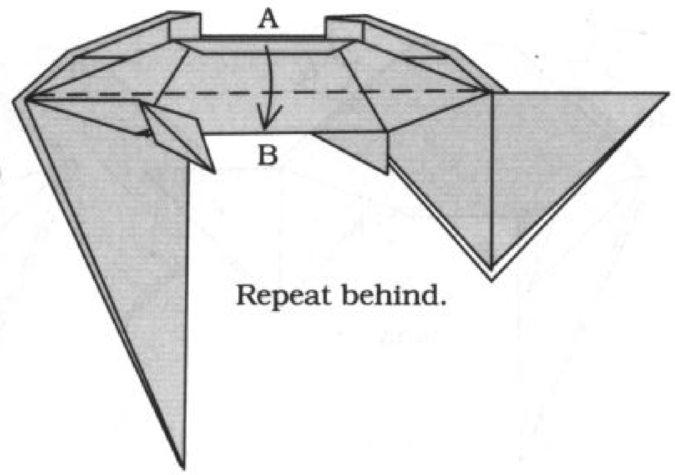
Squash-fold. Repeat behind.

48



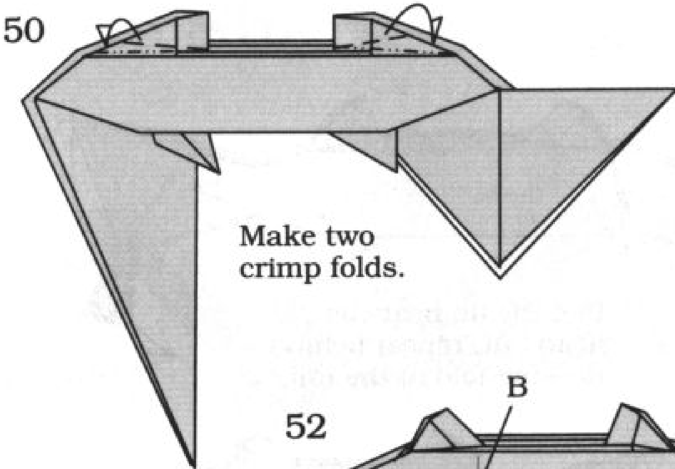
Fold down a little bit so that in step 49, line A will meet line B when A is folded down. Repeat behind.

49



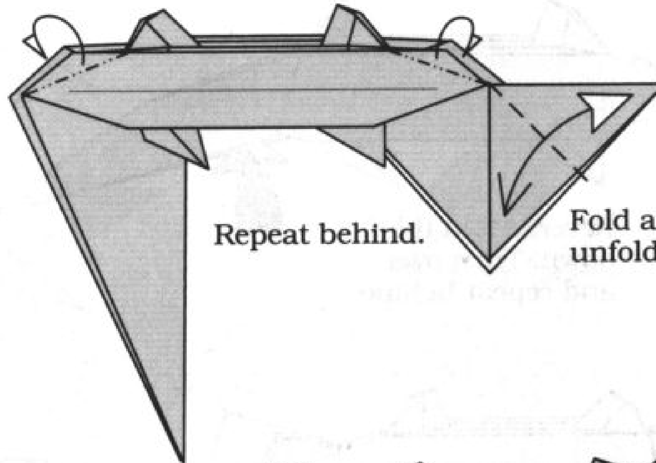
Repeat behind.

50



Make two crimp folds.

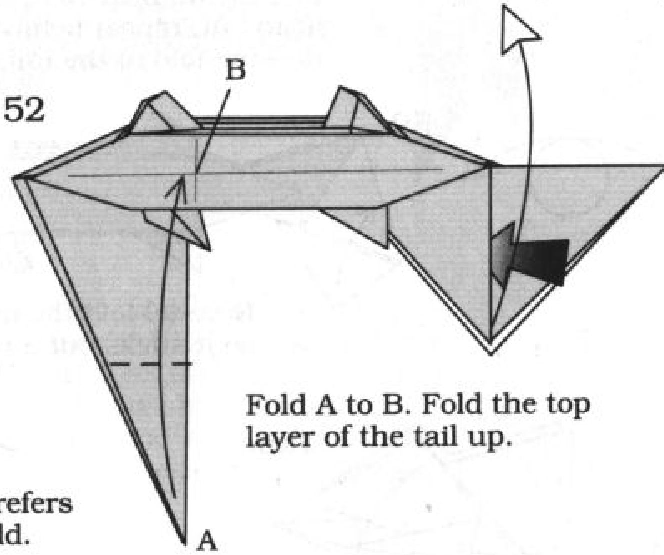
51



Repeat behind.

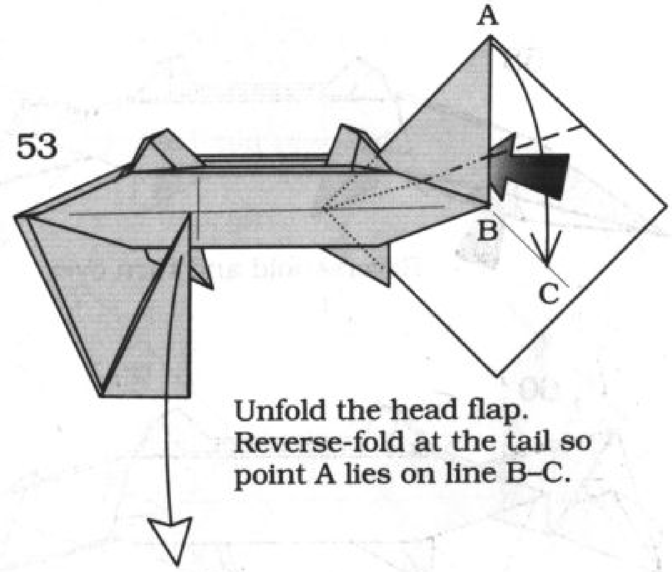
Fold and unfold the tail.

52



Fold A to B. Fold the top layer of the tail up.

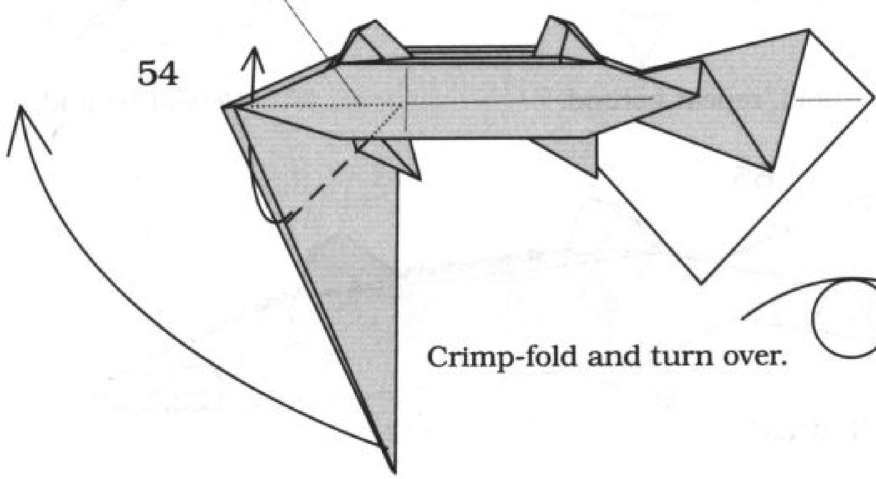
53



Unfold the head flap. Reverse-fold at the tail so point A lies on line B–C.

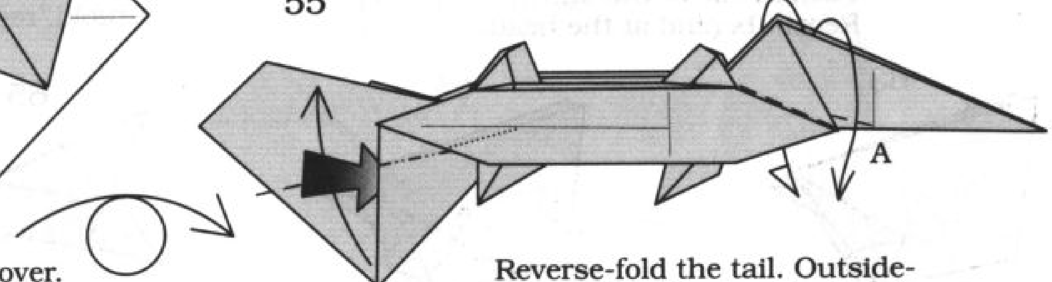
This x-ray line refers to a moutain fold.

54



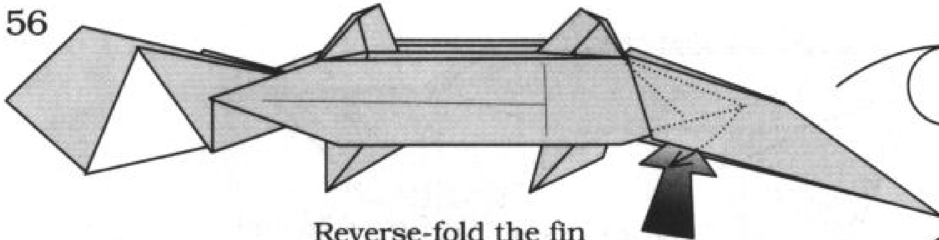
Crimp-fold and turn over.

55



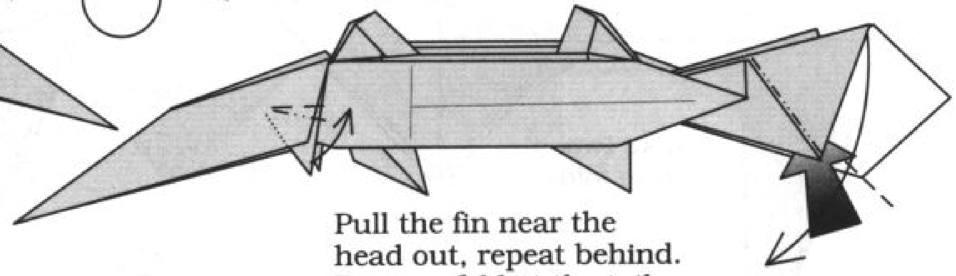
Reverse-fold the tail. Outside-reverse-fold the head using A as a guide.

56



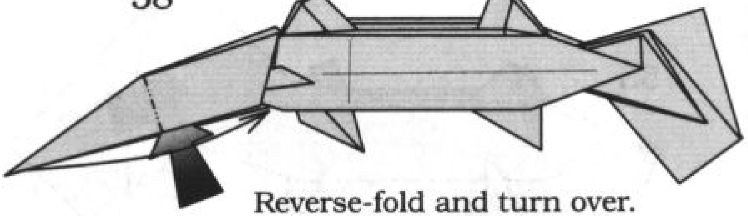
Reverse-fold the fin down. Turn over and repeat behind.

57

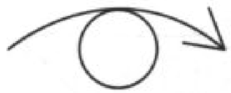


Pull the fin near the head out, repeat behind. Reverse-fold at the tail.

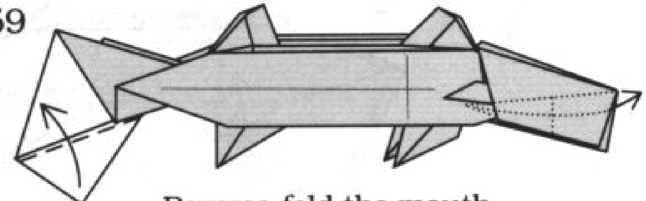
58



Reverse-fold and turn over.

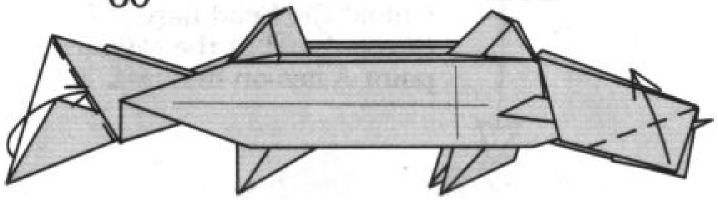


59



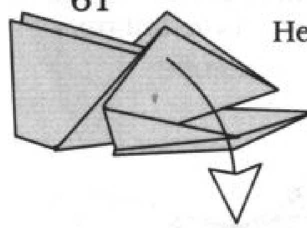
Reverse-fold the mouth so it sticks out a little bit.

60



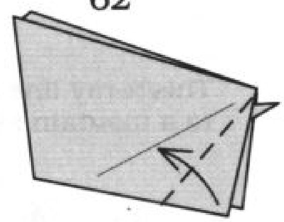
Tuck inside at the tail. Repeat behind at the head.

61



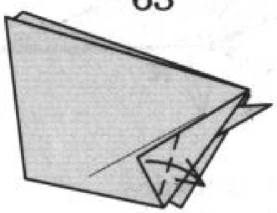
Unfold, repeat behind.

62



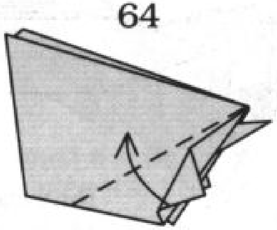
Repeat behind.

63



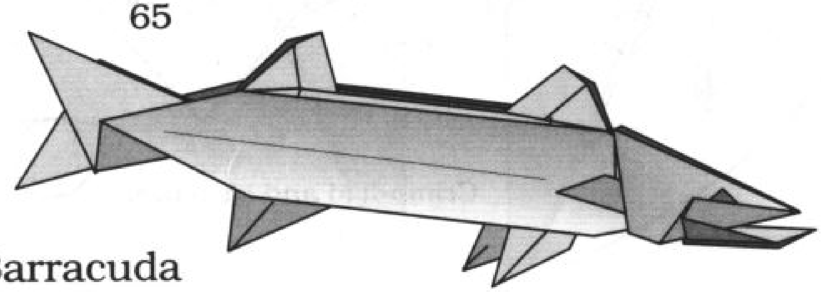
Formation of the eye. Repeat behind.

64



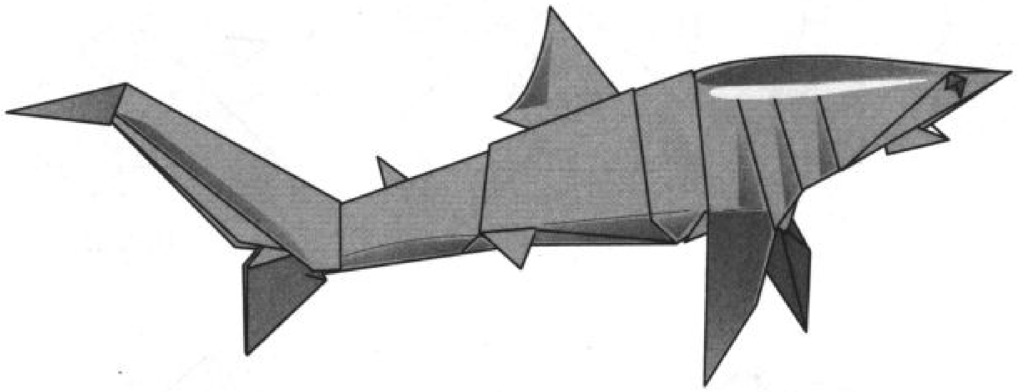
Repeat behind.

65

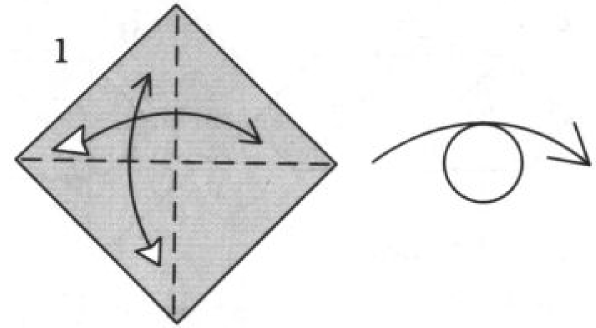


Barracuda

Blue Shark



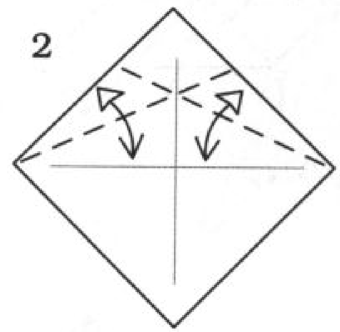
1



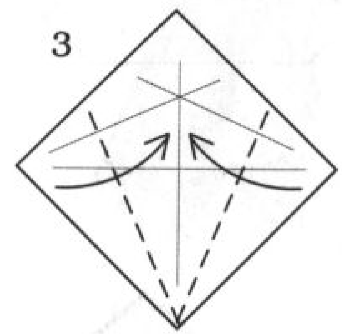
Fold and unfold.

Sharks are among the most primitive forms of fish and have changed little over millions of years. Their skeletons are made of cartilage, not bone. They have a good sense of smell. The blue shark (*Prionace glauca*) is about 10 feet long and weighs about 200 pounds. This big game fish is found in deep coastal waters and feeds on small fish.

2

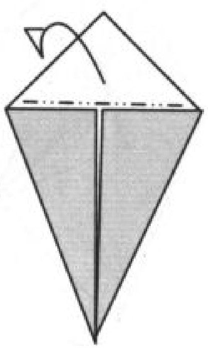


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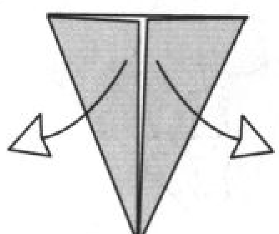


Fold and unfold.

4

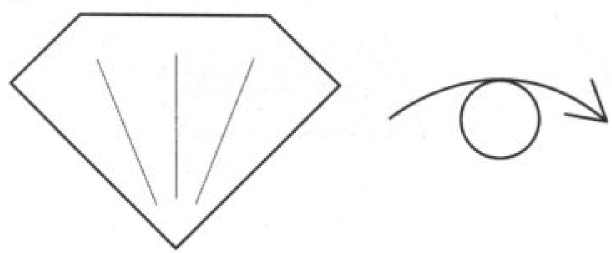


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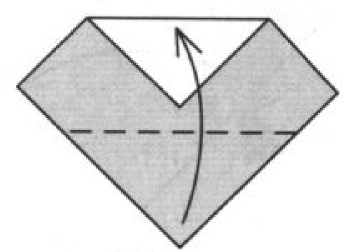


Unfold.

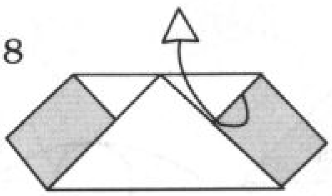
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7

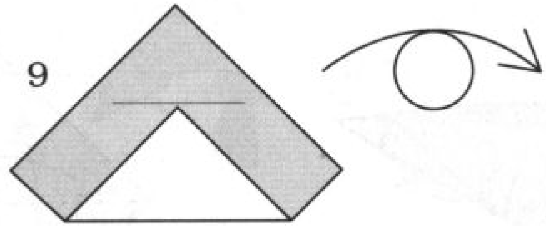


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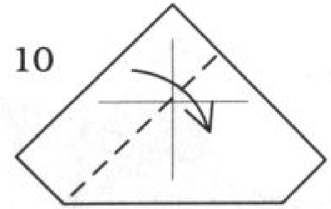


Unfold.

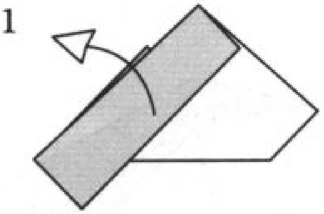
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10

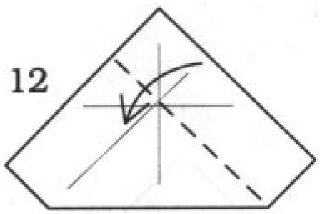


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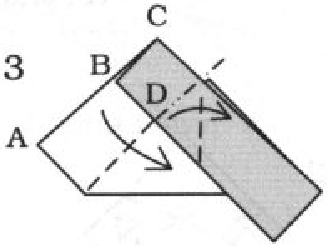


Unfold.

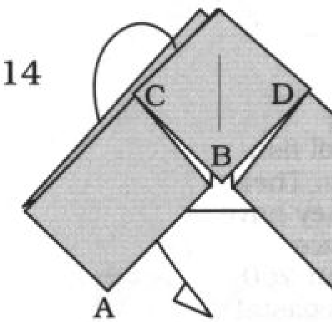
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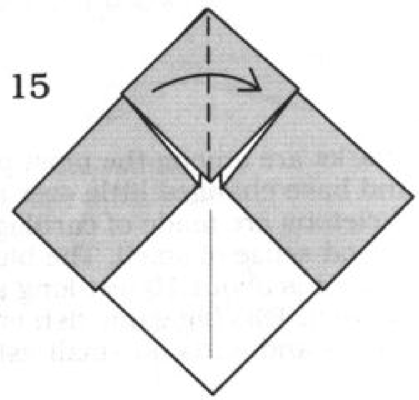
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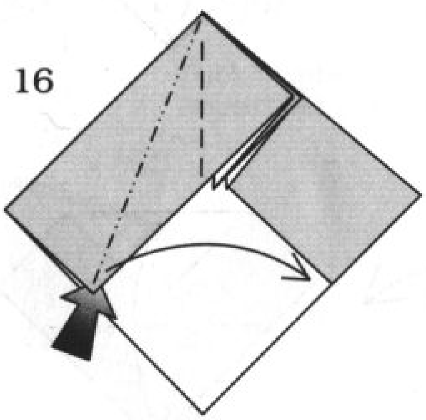
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15

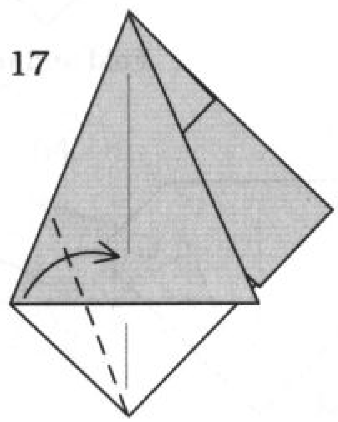


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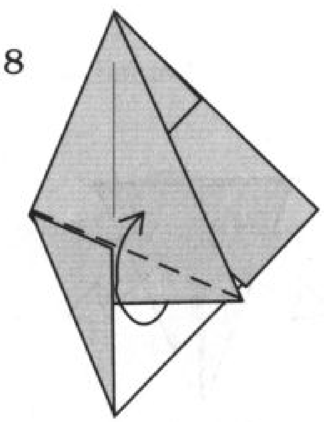


Squash-fold.

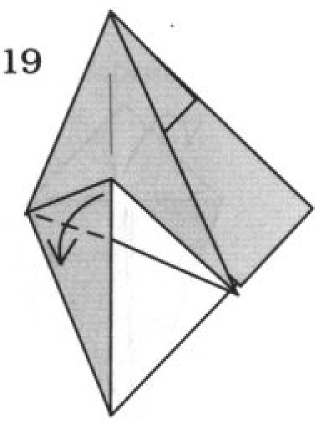
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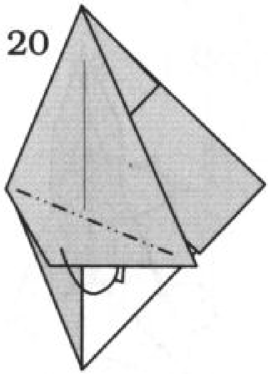
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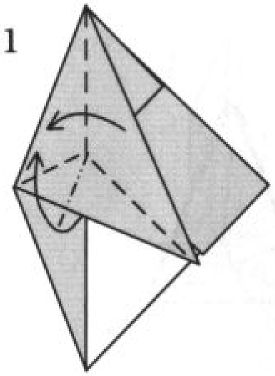
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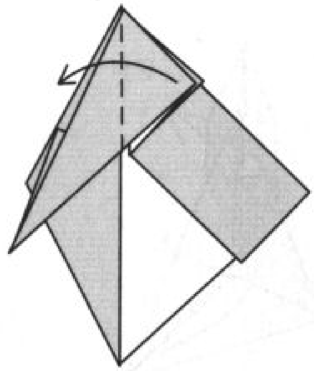
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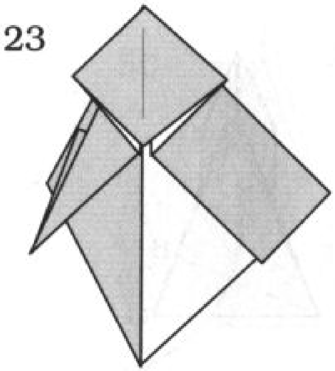
21



22

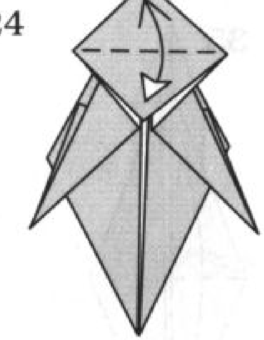


23



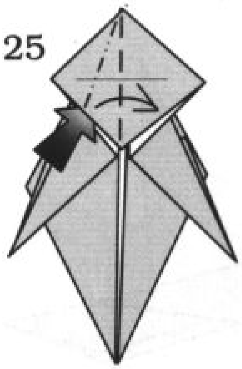
Repeat steps 15–22 on the right.

24



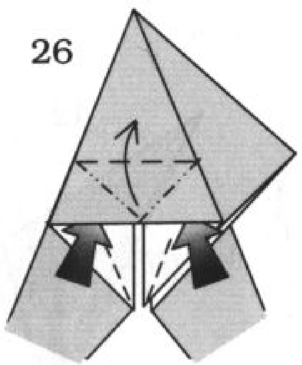
Fold up and unfold.

25



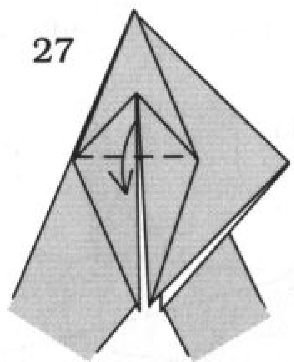
Squash-fold.

26

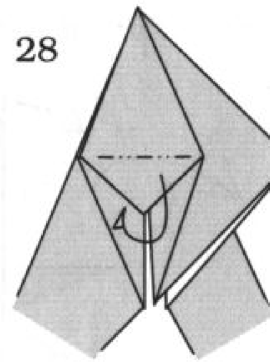


Petal-fold.

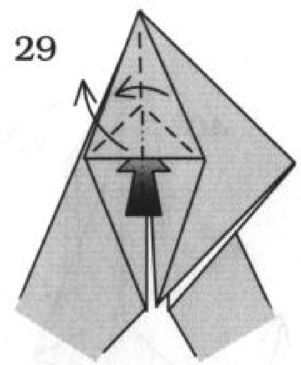
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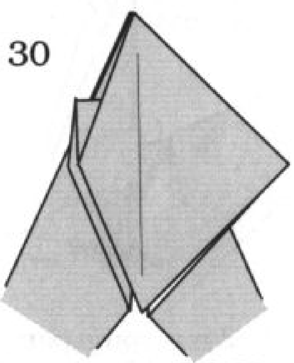
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29

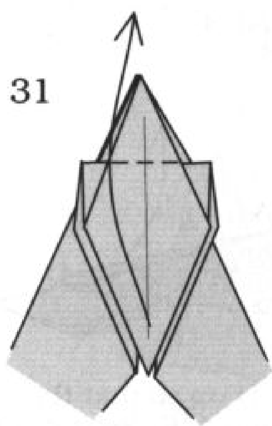


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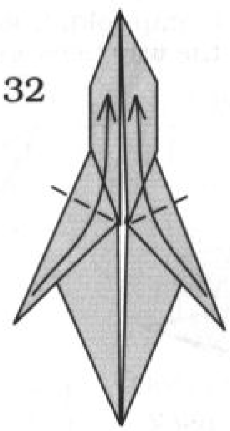


Repeat steps 25–29 on the right.

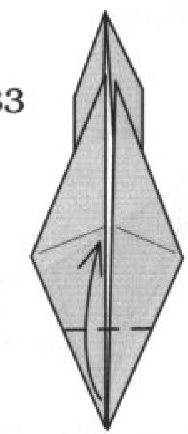
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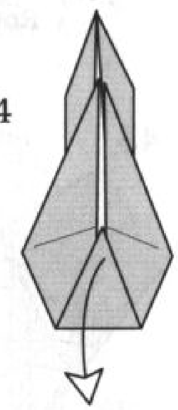
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33

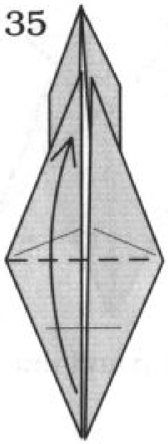


34

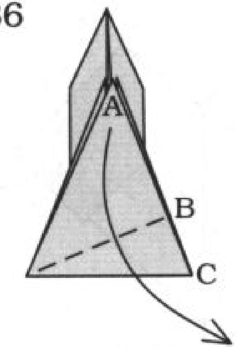


Unfold.

35

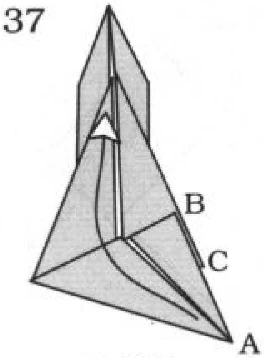


36



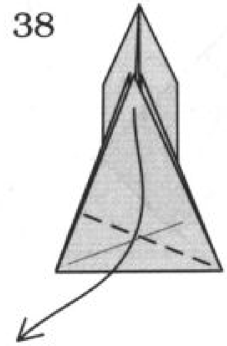
Fold so that line A–B falls along line B–C.

37

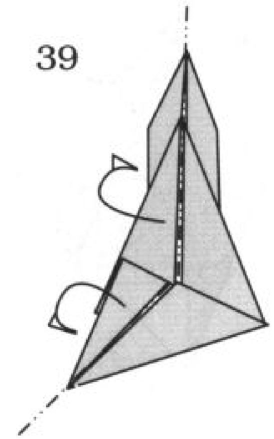


Unfold.

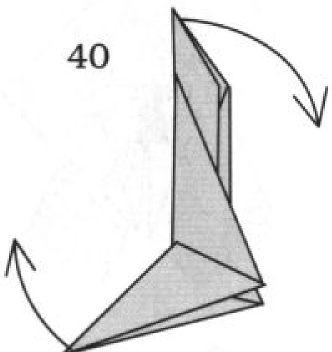
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39

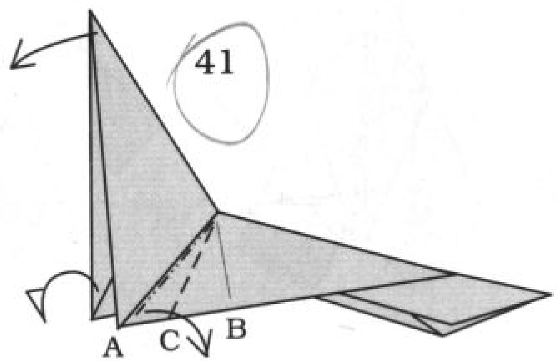


40



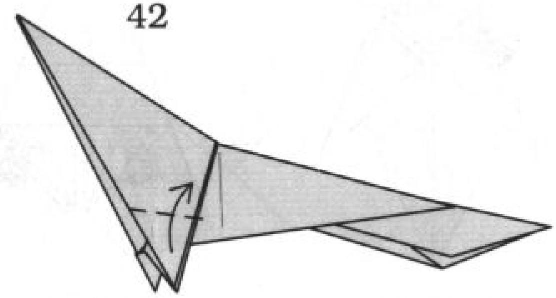
Rotate the model.

41

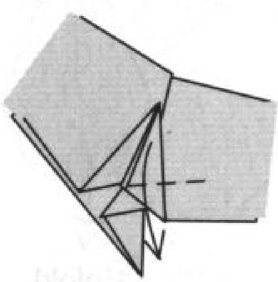


Crimp-fold. C is about 1/3 of the way between A and B.

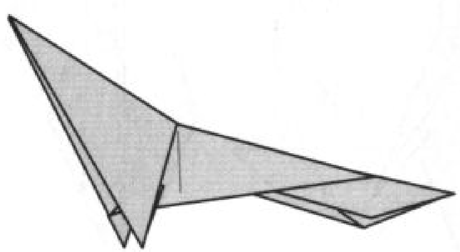
42



43

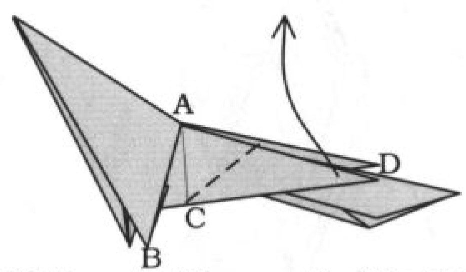


44



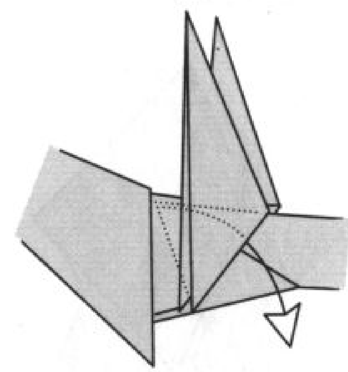
Repeat steps 42–43 on the back.

45



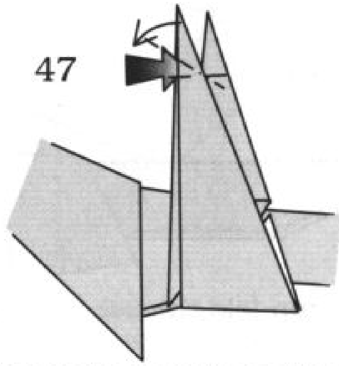
Fold the point D up so that the line C–D is parallel to A–B. Repeat behind.

46



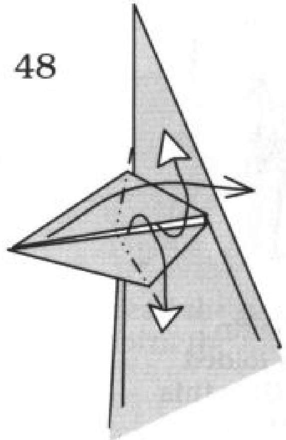
Pull out some paper indicated by the x-ray lines. Repeat behind.

47



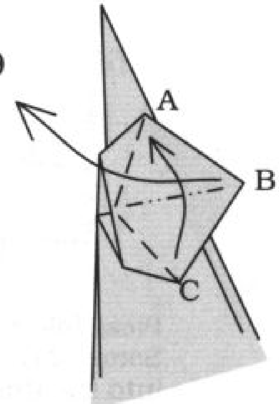
The small upper back fin will now be formed. There are no guide lines for this squash fold, but do not make it too small.

48



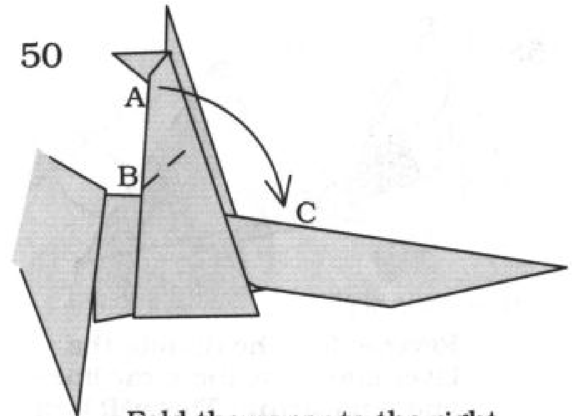
Spread the paper while folding to the right.

49



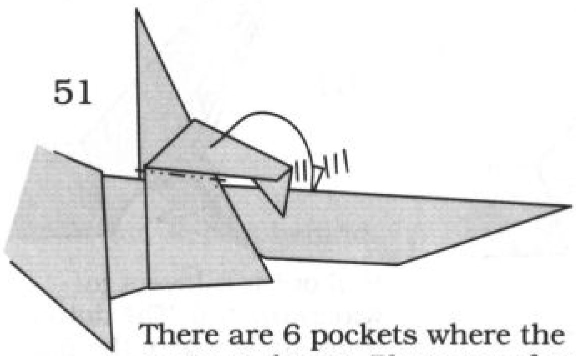
Fold C to A while B is folded up and to the left.

50



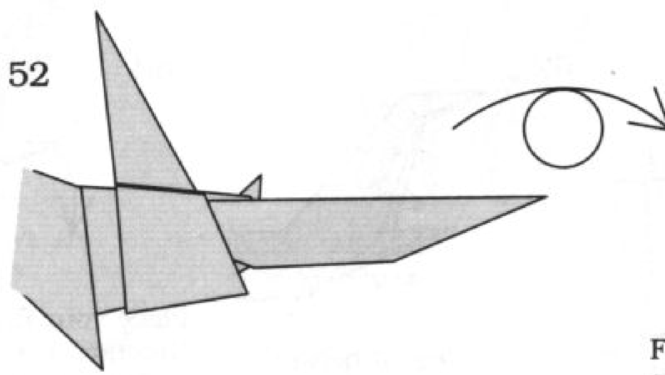
Fold the paper to the right so that the line A–B is just above B–C.

51

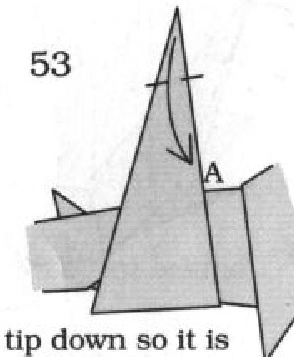


There are 6 pockets where the arrow is drawn. Place your finger into the third pocket — that is where the paper will be folded.

52

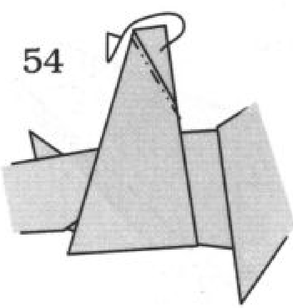


53

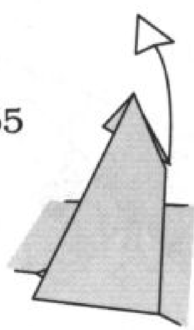


Fold the tip down so it is a bit above the corner A.

54

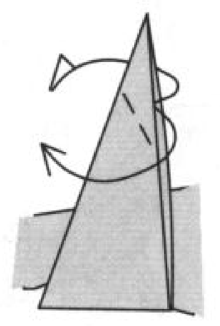


55



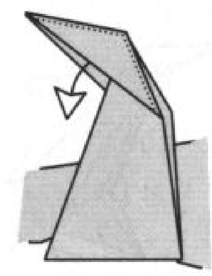
Unfold.

56



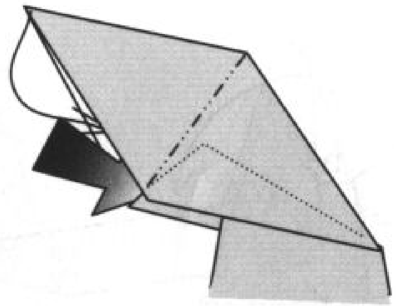
Outside-reverse-fold along the creases.

57



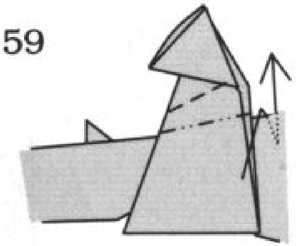
Pull out some paper. Repeat behind.

58



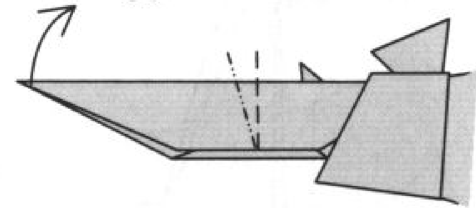
Reverse-fold the tip into the layer shown by the x-ray lines and large arrow. This will lock the fin.

59



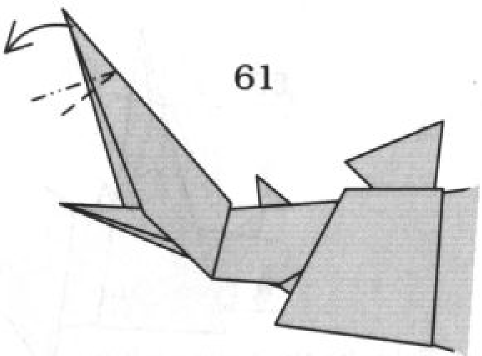
Pleat-fold to place the fin. Some of the paper is folded into the third layer. Give this fold a good, sharp crease.

60



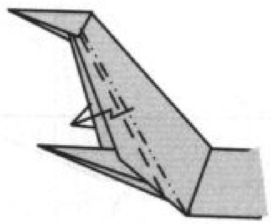
Crimp-fold the tail.

61



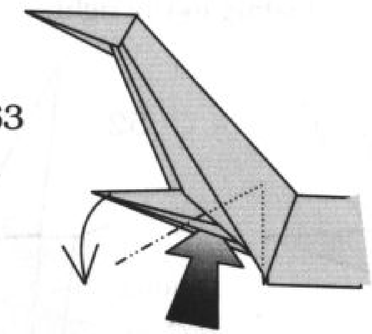
Crimp-fold the tip of the tail.

62



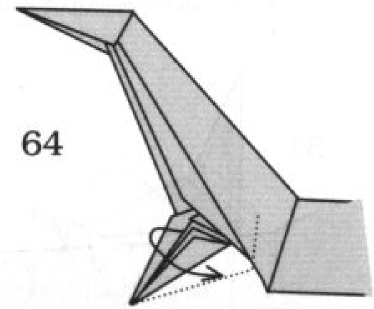
Repeat behind.

63



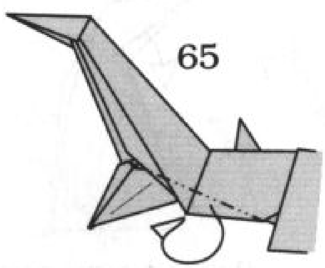
Place your finger into the most central layer to reverse-fold the lower part of the tail.

64



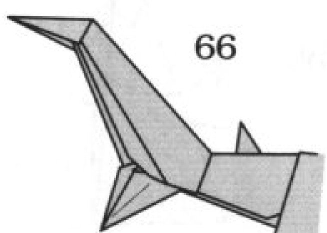
Pull out two layers to widen the tail. The dotted lines show where the paper will go. Repeat behind.

65



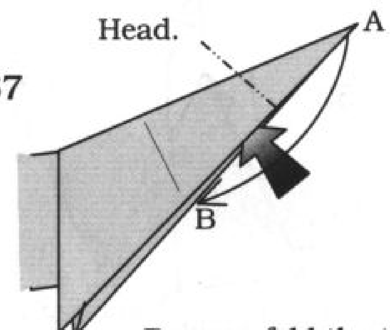
Repeat behind.

66



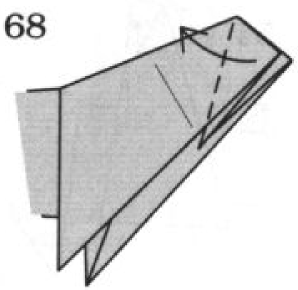
Completed tail.

67

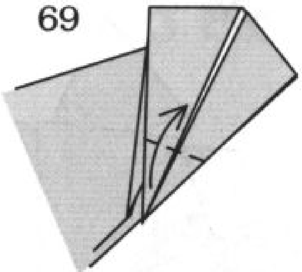


Reverse-fold the tip A to B.

68

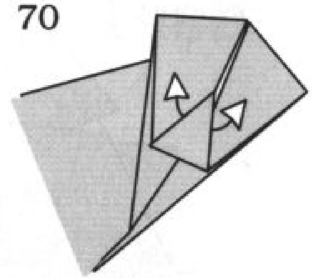


69



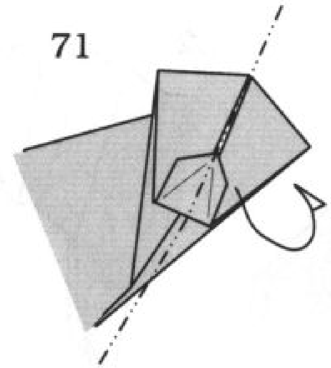
Fold the mouth up about 1/3 of the way.

70

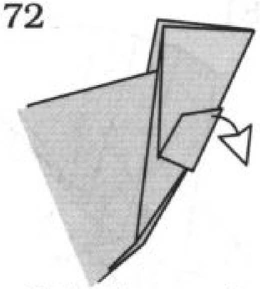


Spread the paper to form the mouth.

71

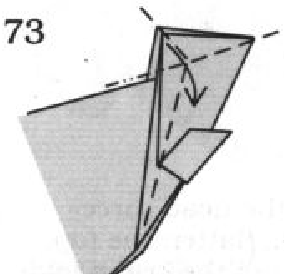


72



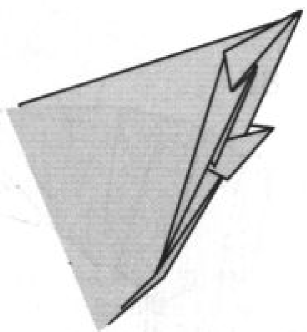
Slide the mouth.

73



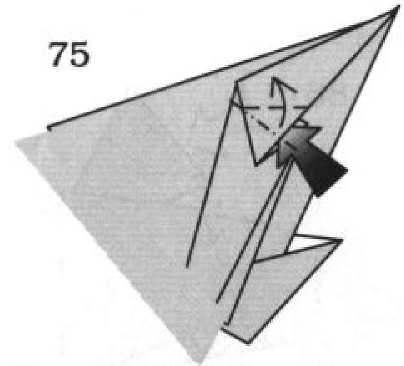
Rabbit-ear. Repeat behind.

74



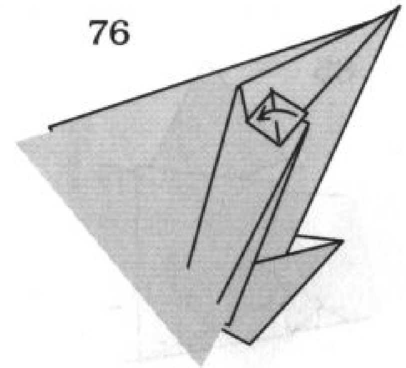
Step 75 shows an enlarged view.

75



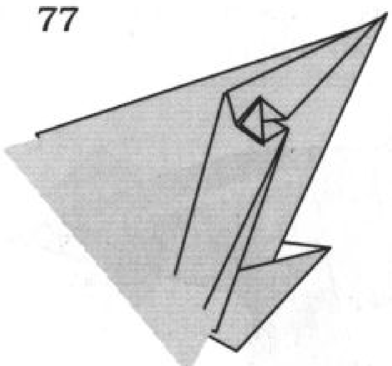
Squash-fold to form the eye. Repeat behind.

76



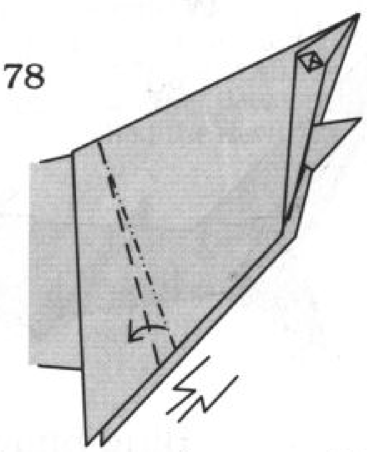
Repeat behind.

77



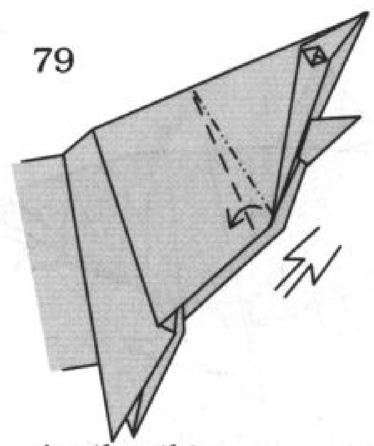
Completed eyes.

78



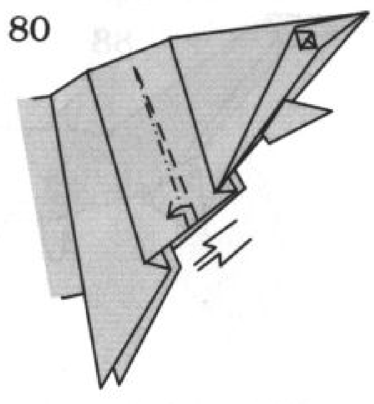
This is a very thin crimp fold.

79



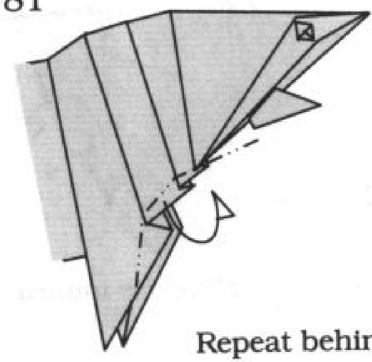
Another thin crimp at the head.

80



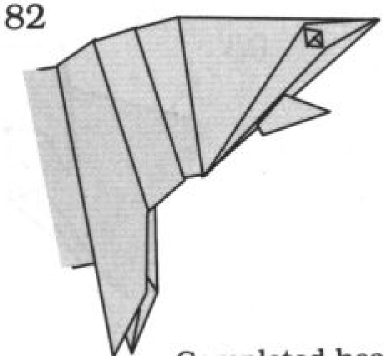
One more crimp-fold between the others.

81



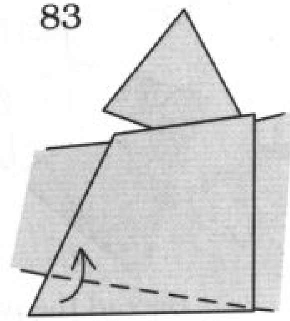
Repeat behind.

82



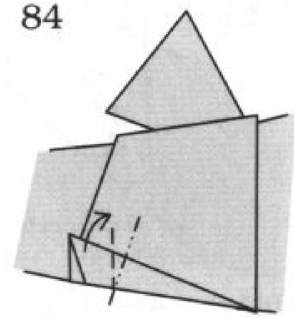
Completed head.

83



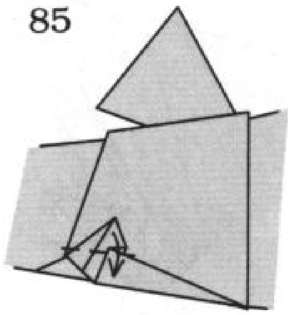
Formation of the lower fins. Repeat behind.

84



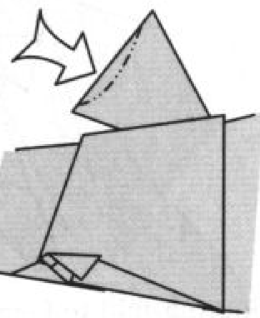
Repeat behind.

85



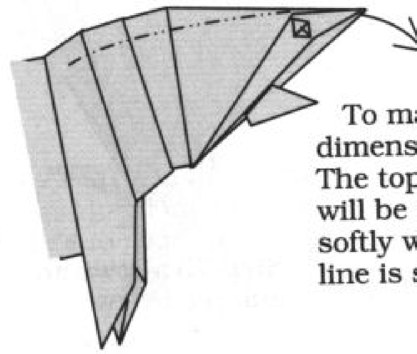
Repeat behind.

86



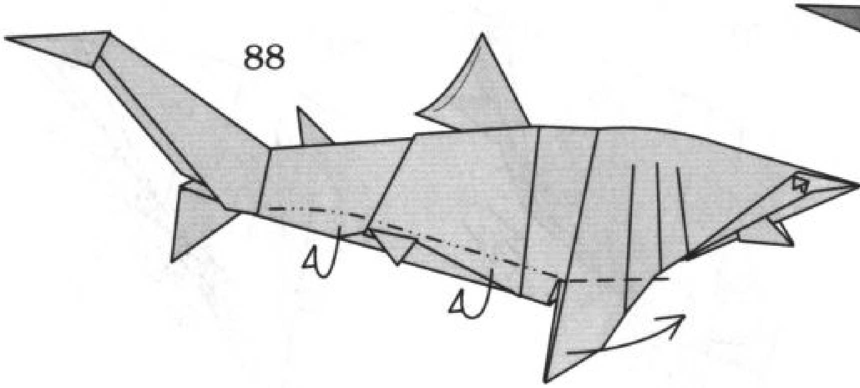
Shape the fin.

87



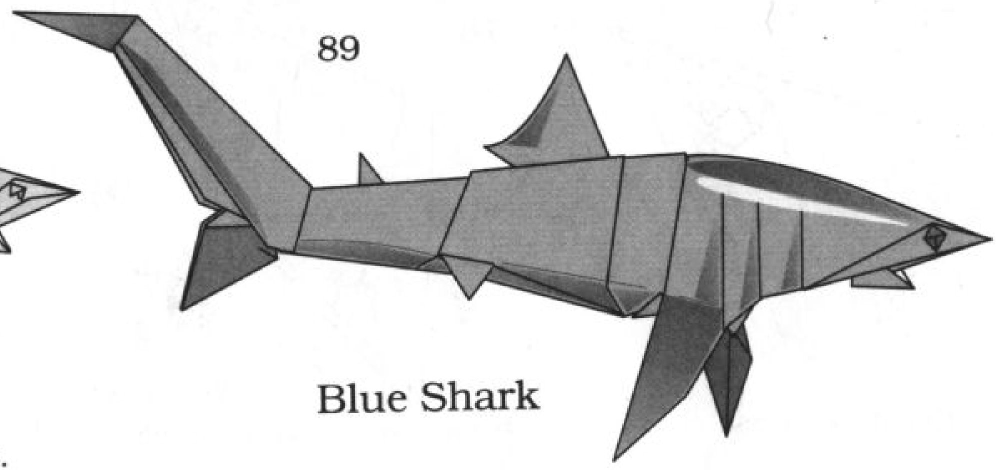
To make the head three-dimensional, flatten the top. The top part of the crimp folds will be unfolded. Crease very softly where the mountain fold line is shown. Repeat behind.

88



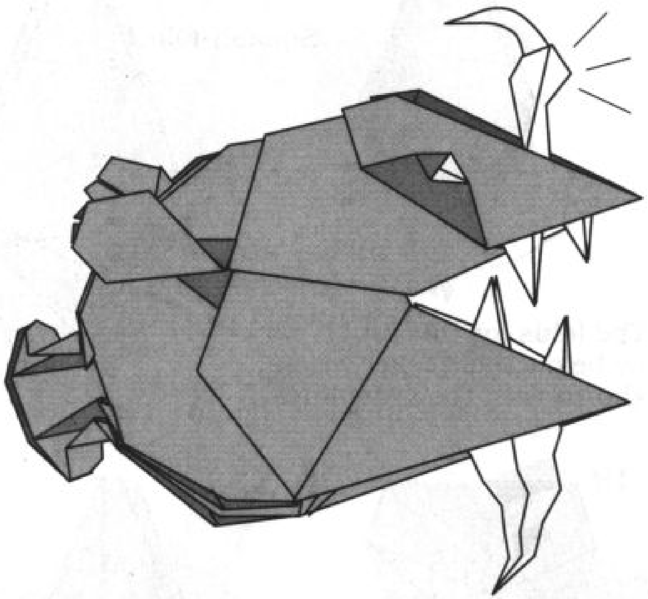
Crease lightly on the mountain and valley lines to make the shark three-dimensional. Repeat behind.

89

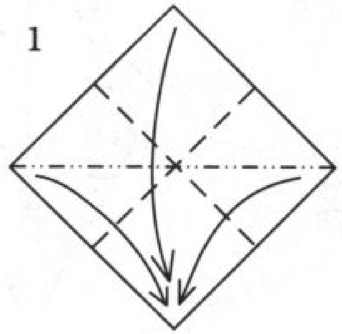


Blue Shark

Deep Sea Angler Fish

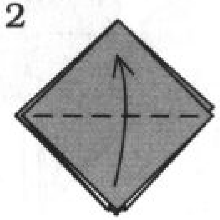


1



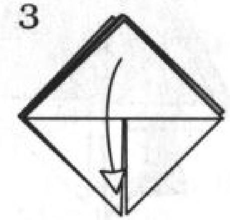
Begin with the Preliminary Fold.

2



Fold up, repeat behind.

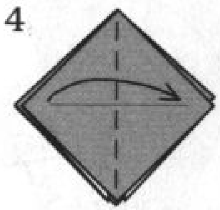
3



Unfold, repeat behind.

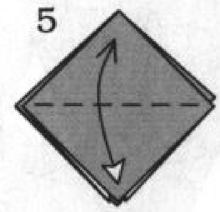
This scary looking fish lives in the deep sea at depths of two miles and more. It ranges in size from two inches to six feet. The majority of the fish is mouth and stomach, both of which are expandable and allow the fish to swallow a meal up to twice its own size. Because no light penetrates to the depth where this fish lives, many of the creatures use bioluminescence. The deep sea angler (*Linophryne arborifer*) uses light to its advantage by having a small "lamp" on the top of its head. Other fish are attracted to the light without noticing the waiting jaws of death. For obvious reasons, this fish has been called the devil's lantern.

4



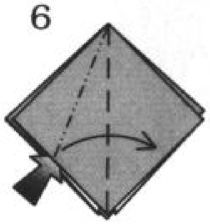
Repeat behind.

5



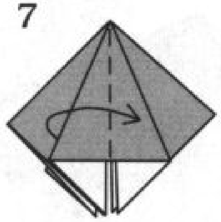
Fold up and unfold. Repeat behind.

6



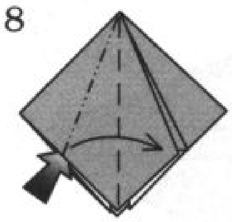
Squash-fold. Repeat behind.

7



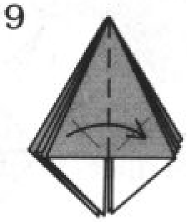
Repeat behind.

8



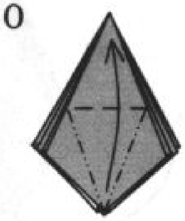
Squash-fold. Repeat behind.

9



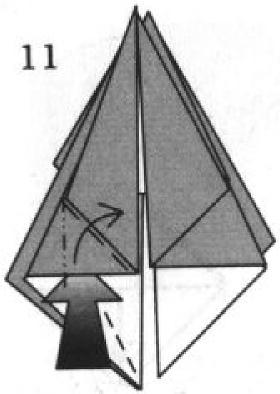
Repeat behind.

10



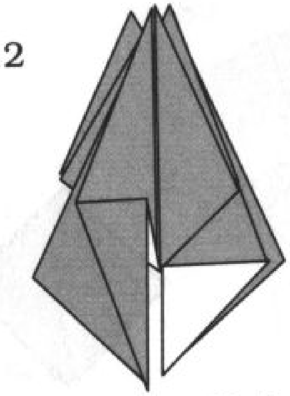
Petal-fold. Repeat behind.

11



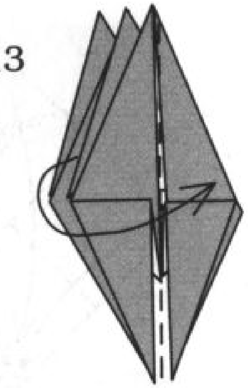
Squash-fold.

12



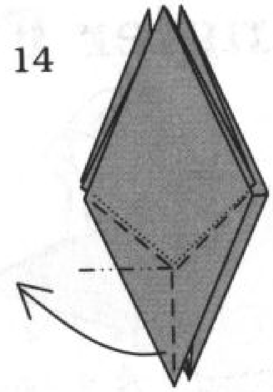
Repeat step 11 three times, on the right and behind.

13



Repeat behind.

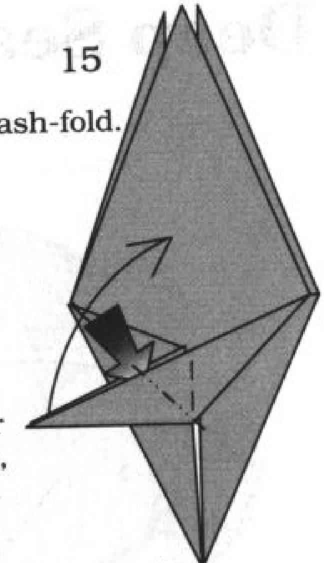
14



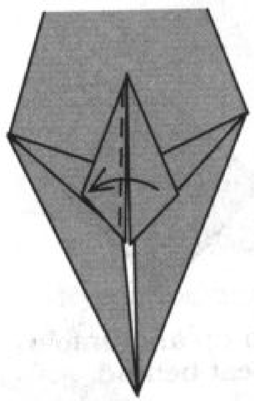
The folds for this rabbit ear lie below the thicker region, shown with the x-ray lines.

15

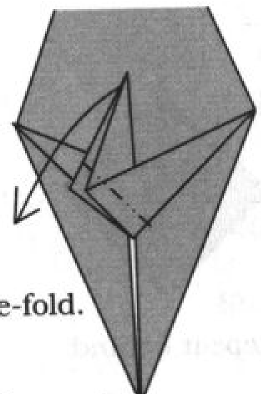
Squash-fold.



16

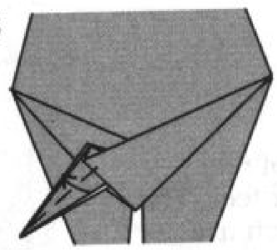


17



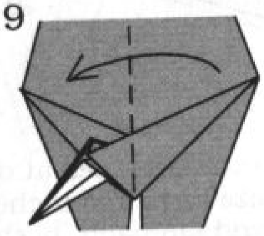
Reverse-fold.

18

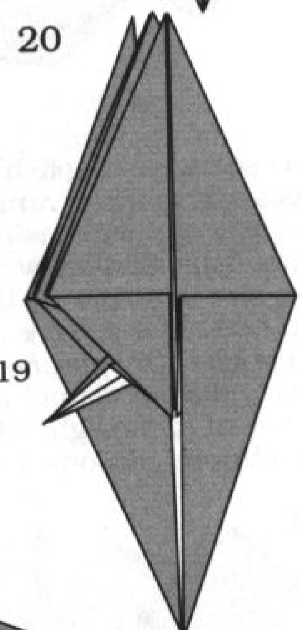


Make the flap white. Repeat behind.

19

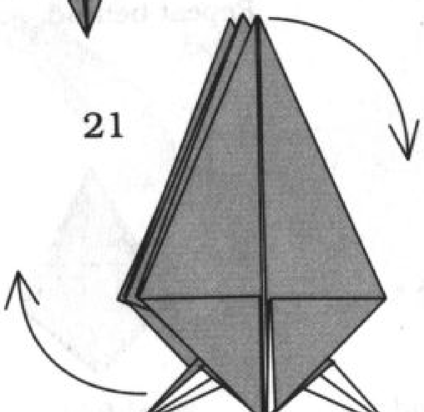


20



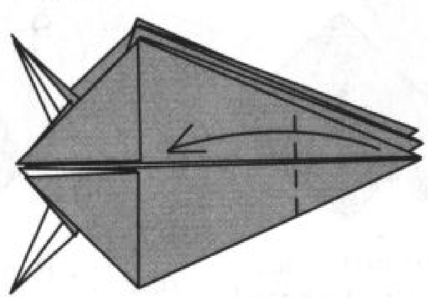
Repeat steps 14–19 behind.

21

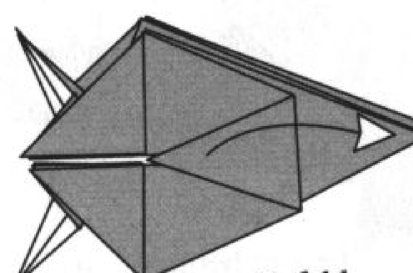


Rotate the model.

22

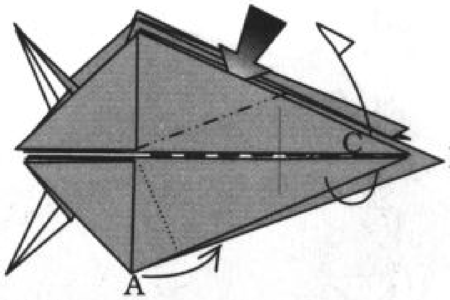


23



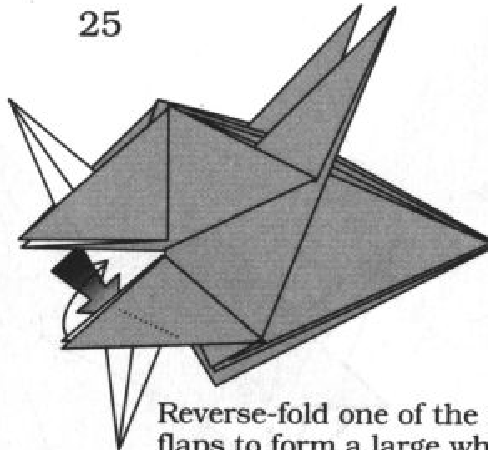
Unfold.

24



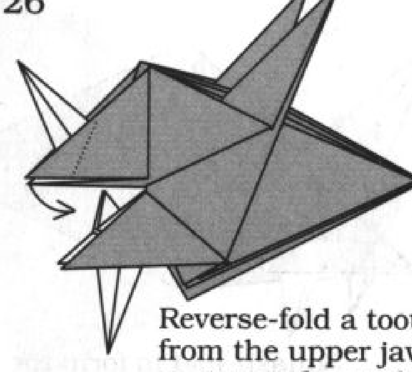
This fold will open the mouth. While folding C up, the corner A will end up along the line A–B. The x-ray line represents a valley fold in the hidden layers. Not only is this to be repeated behind, but it will not work otherwise.

25



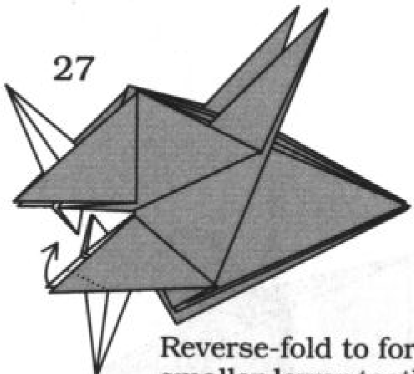
Reverse-fold one of the inner flaps to form a large white tooth on the lower jaw. Be sure to find the right layer to place your finger to make the tooth white.

26



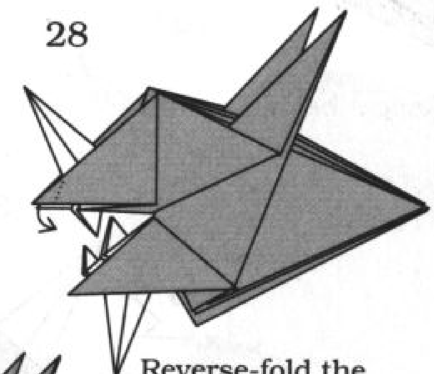
Reverse-fold a tooth from the upper jaw so it is in front of the larger tooth.

27



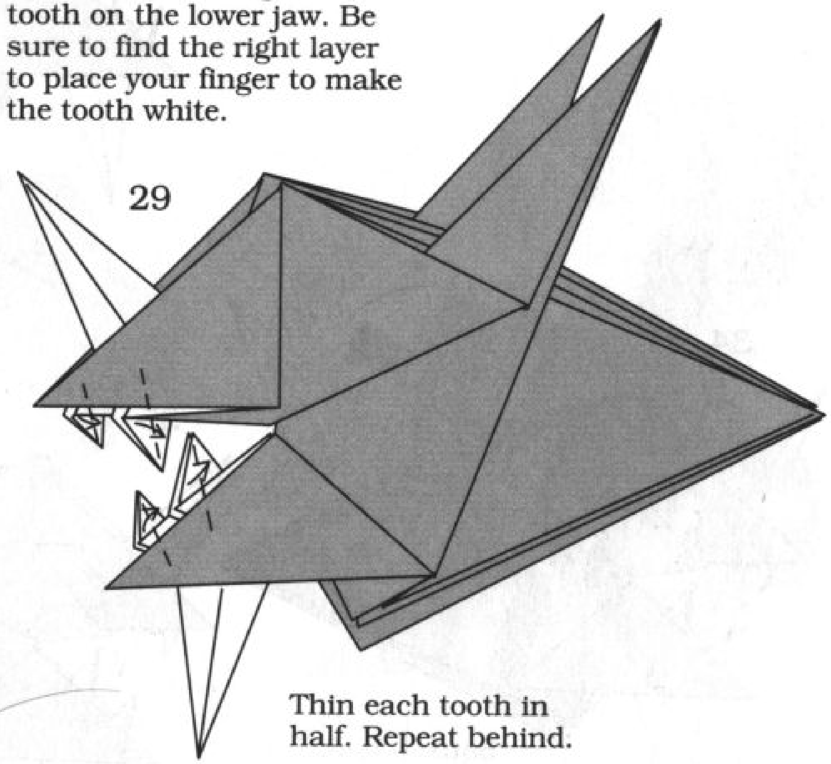
Reverse-fold to form a smaller lower tooth.

28



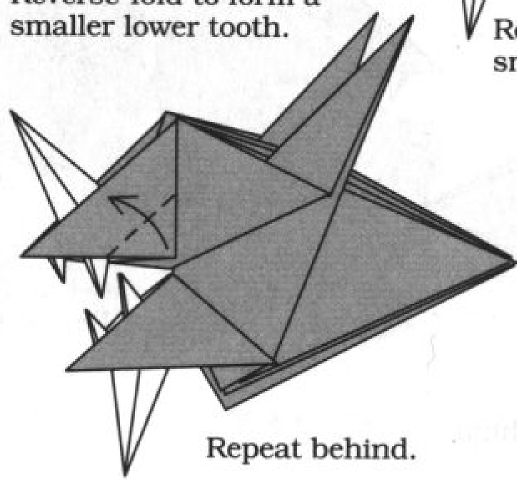
Reverse-fold the smallest tooth.

29



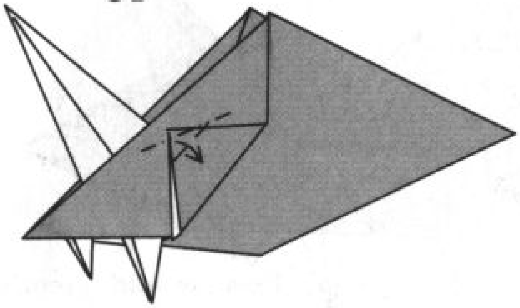
Thin each tooth in half. Repeat behind.

30



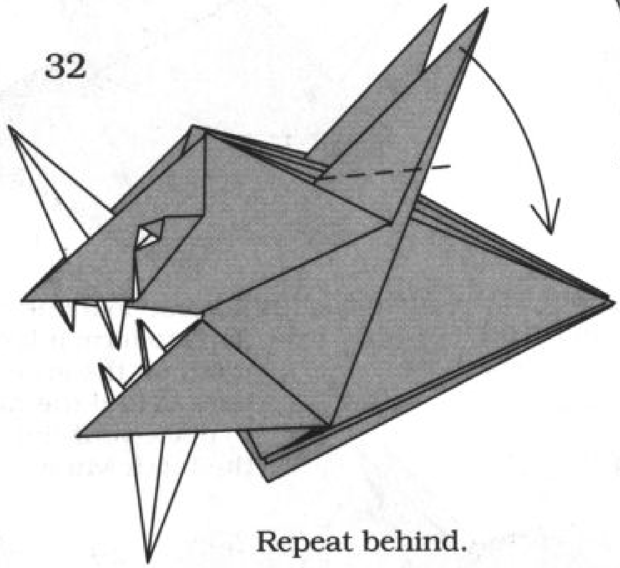
Repeat behind.

31



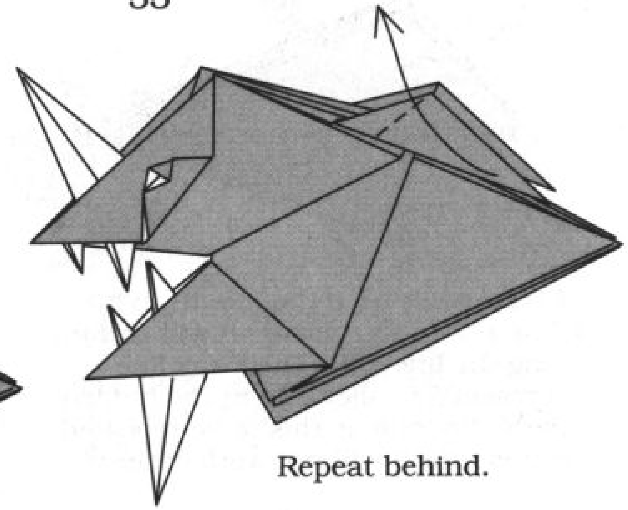
Squash-fold to form the eye. Repeat behind.

32



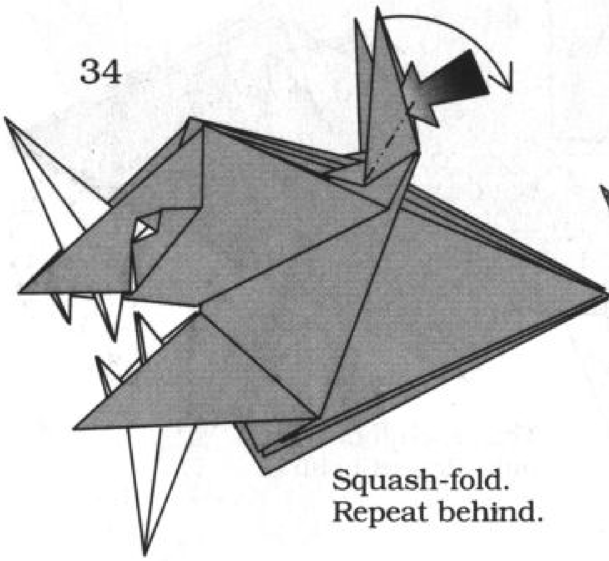
Repeat behind.

33



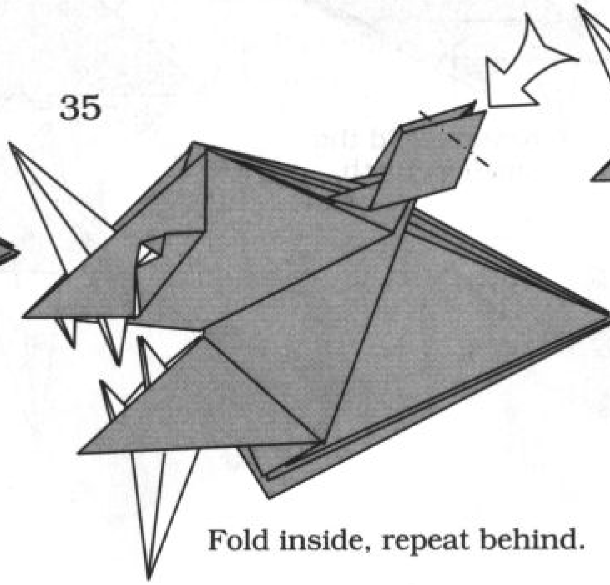
Repeat behind.

34



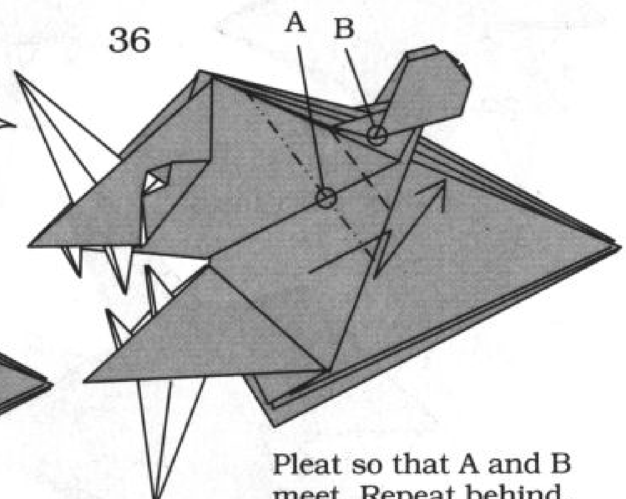
Squash-fold. Repeat behind.

35



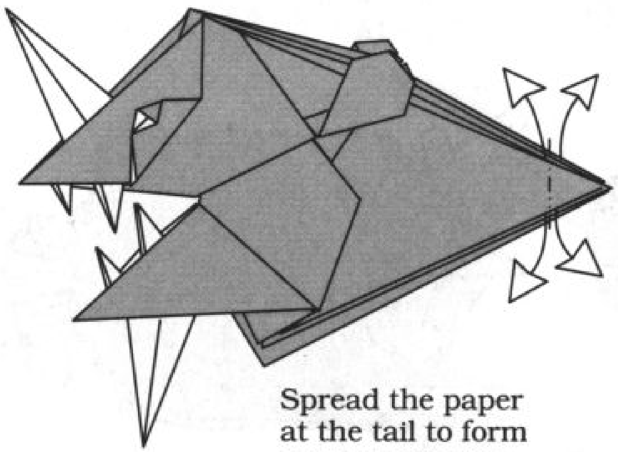
Fold inside, repeat behind.

36



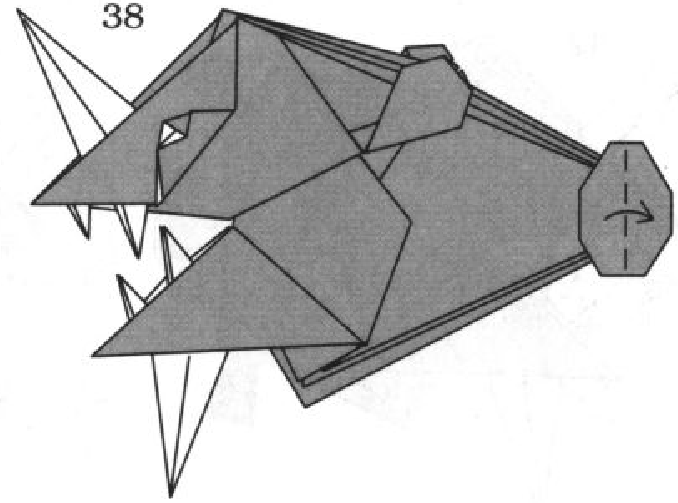
Pleat so that A and B meet. Repeat behind.

37

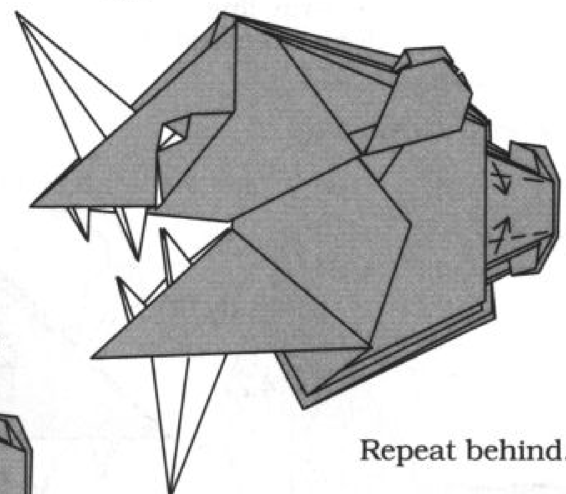


Spread the paper at the tail to form an even octagon.

38

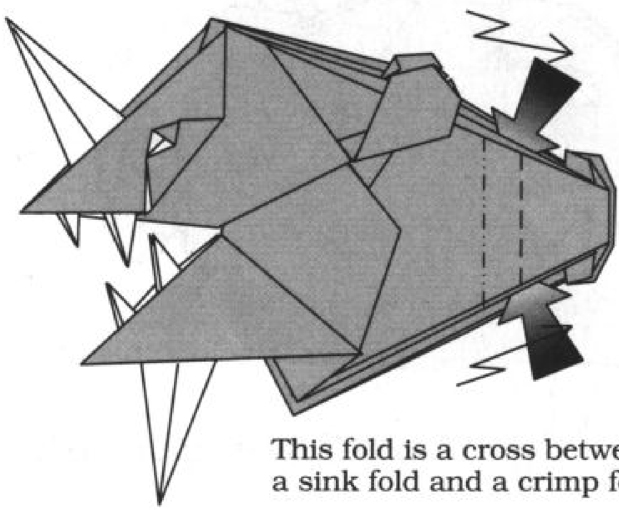


40



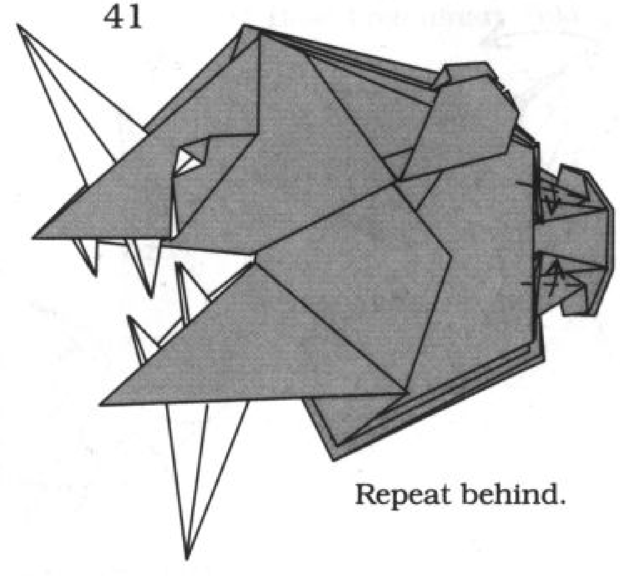
Repeat behind.

39



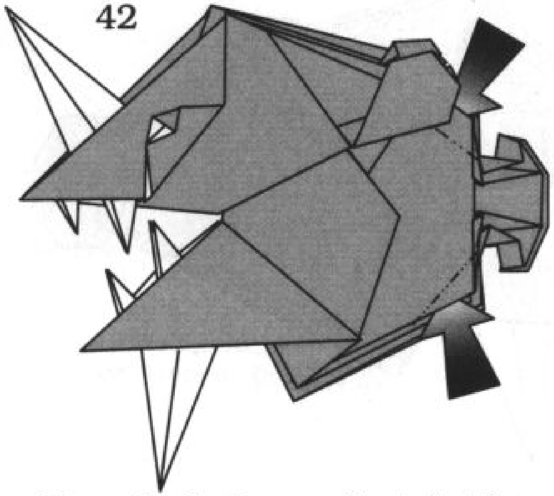
This fold is a cross between a sink fold and a crimp fold.

41



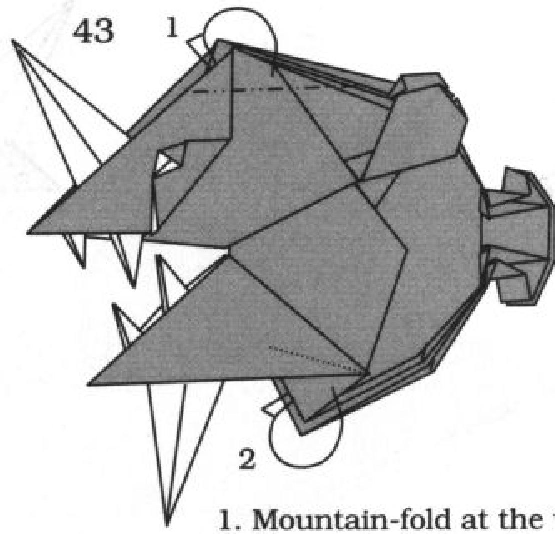
Repeat behind.

42



Shape the body near the tail with reverse folds. Repeat behind.

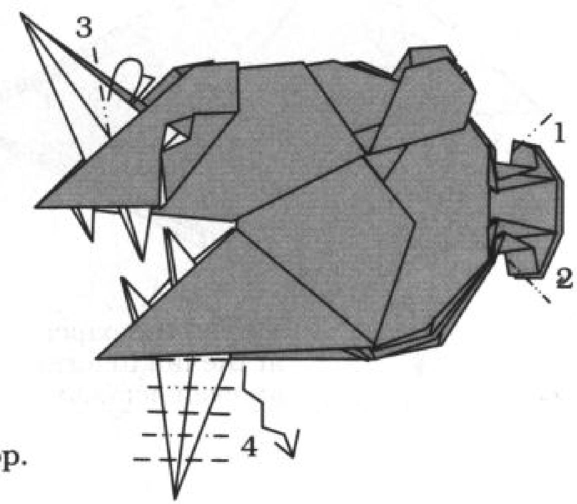
43



1. Mountain-fold at the top.
2. Mountain-fold on the x-ray line.

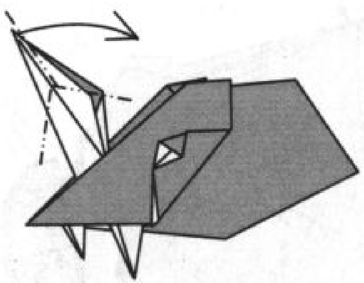
Repeat behind.

44



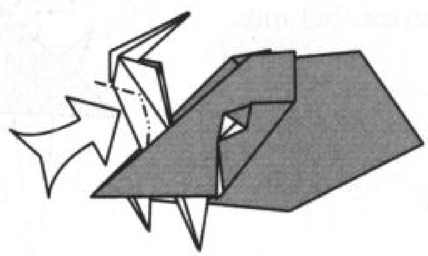
1, 2. Shape the tail with reverse folds.
3. Mountain-fold, repeat behind.
4. Valley and mountain folds.

45



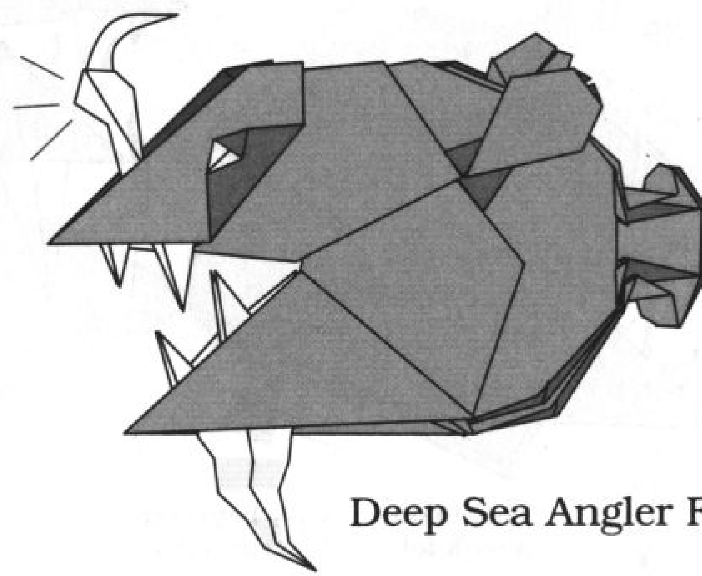
Double-rabbit-ear.

46



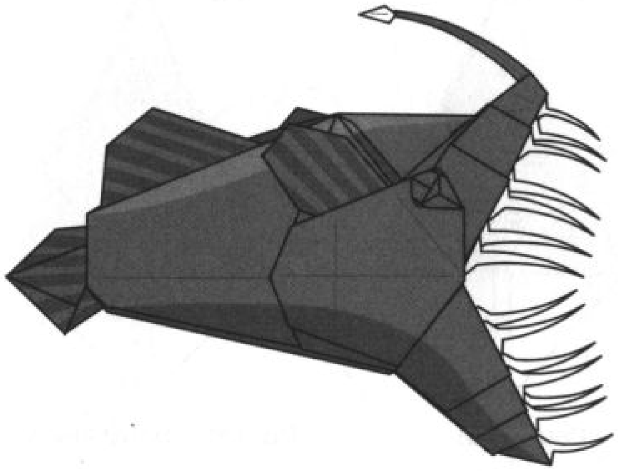
Make the lure three-dimensional.

47



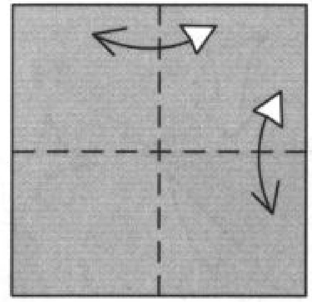
Deep Sea Angler Fish

Blackdevil Angler



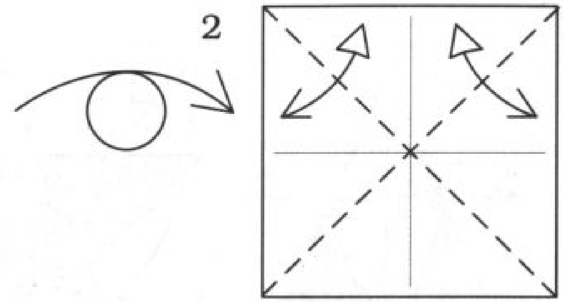
The Blackdevil Angler (*Melanocetus niger*) may well be one of the most scary fishes in the world. But despite their ferocious appearance, deep sea anglers rarely reach six inches in length. They are black and tend to have warty growths over their body. The female is much larger than the male, which lives its life parasitically attached to the female's body. This greatly enhances the chances for reproduction in an environment where individuals might otherwise never meet another of their own species.

1



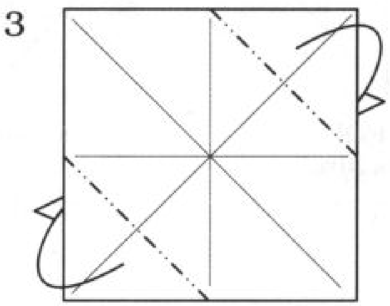
Crease. Turn the paper over.

2



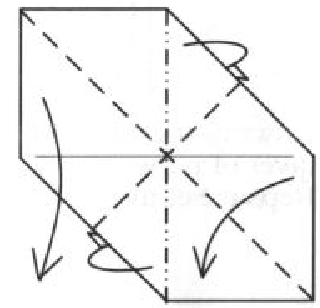
Crease the diagonals.

3



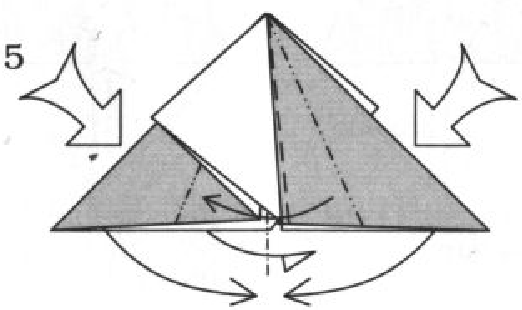
Fold the corners behind.

4



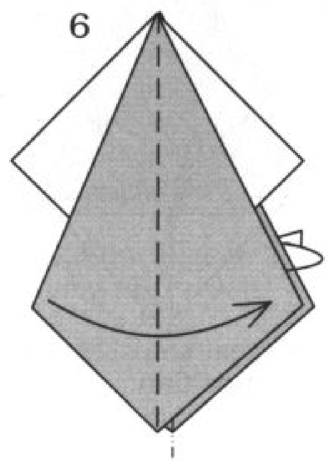
Fold a hybrid Waterbomb Base-Preliminary Fold.

5



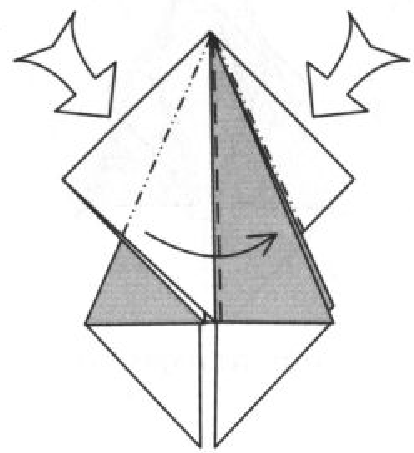
Squash-fold. Repeat behind.

6



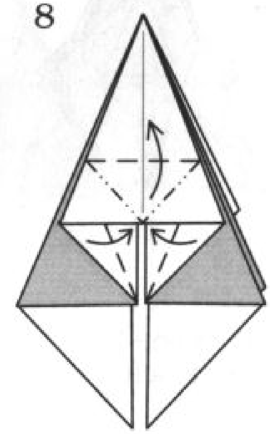
Fold one layer to the right in front and one to the left in back.

7



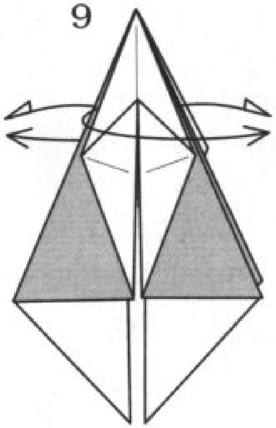
Squash-fold. Repeat behind.

8



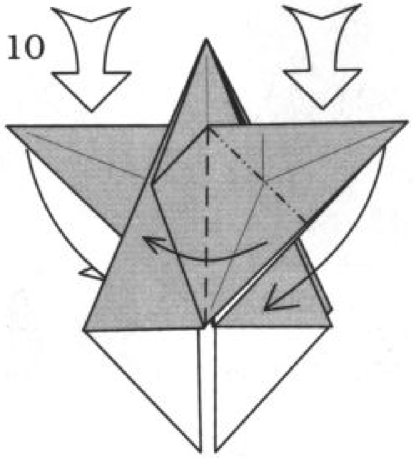
Petal-fold. Repeat behind.

9



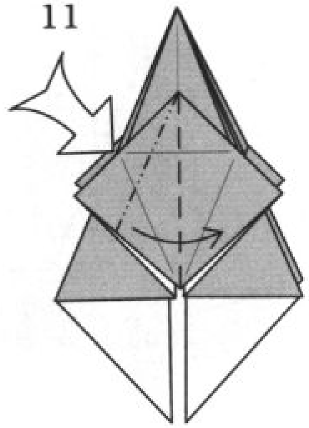
Unwrap the trapped
layer of paper.
Repeat behind.

10



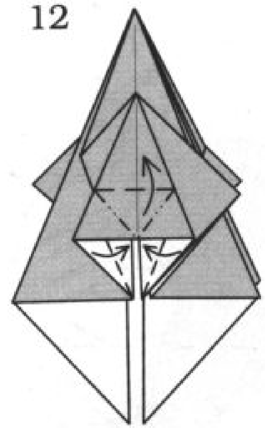
Squash-fold.
Repeat behind.

11



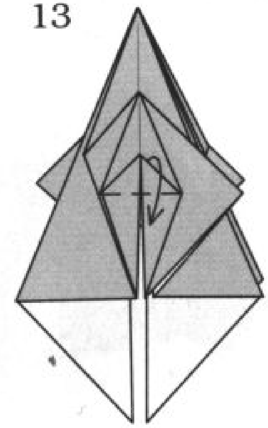
Squash-fold.

12



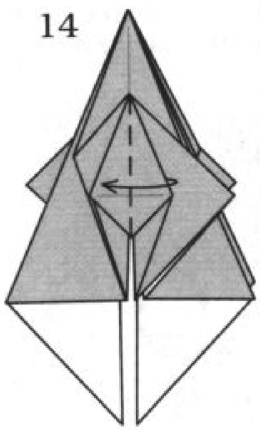
Petal-fold.

13



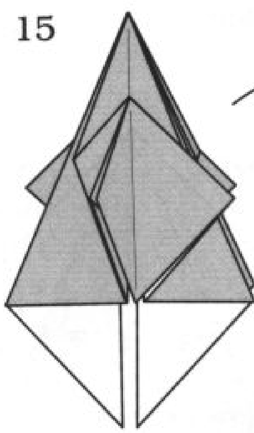
Fold the point down.

14



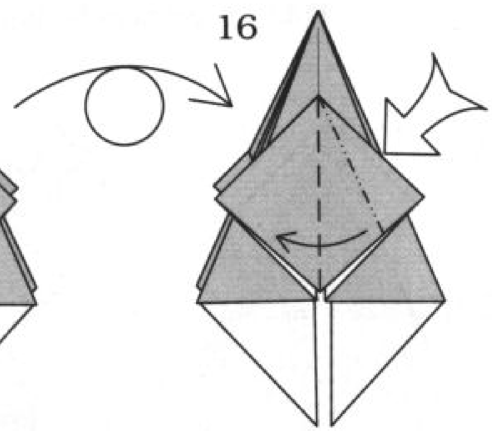
Fold one layer
to the left.

15



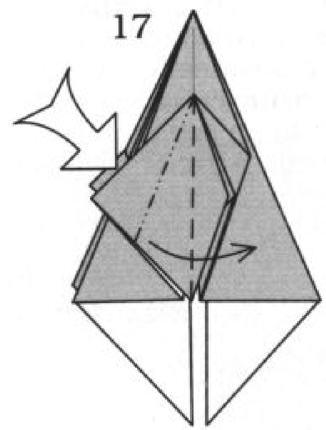
Turn the paper over.

16



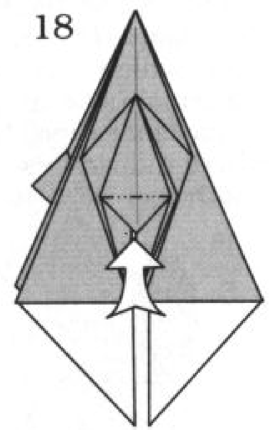
Repeat steps 11–14
on this flap.

17



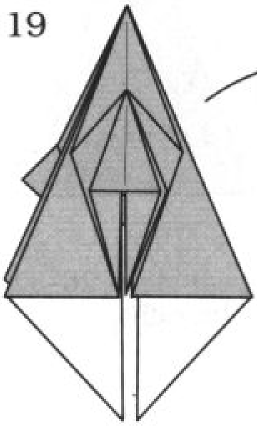
Repeat steps 11–13
on this flap.

18



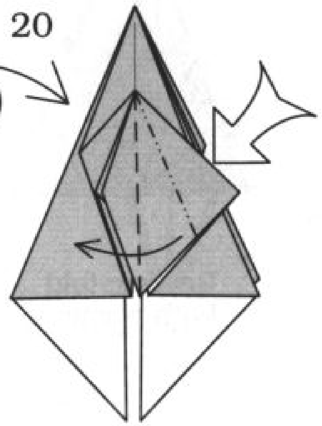
Reverse-fold the
point up inside
the model.

19



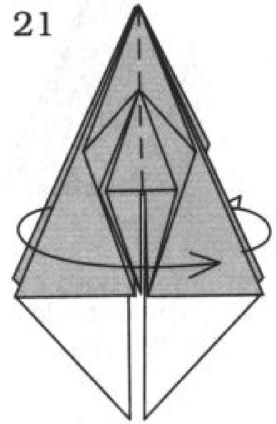
Turn the model over.

20



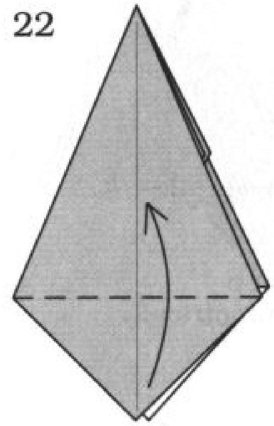
Repeat steps 11–13 and 18 on this flap.

21



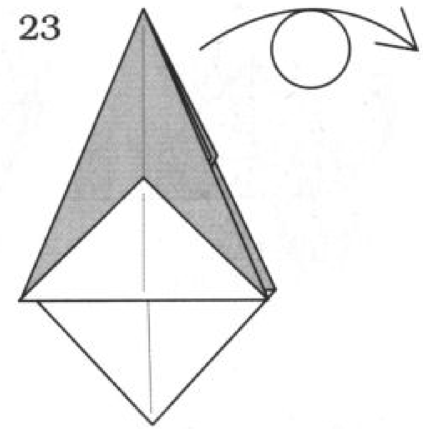
Rearrange the layers as shown.

22



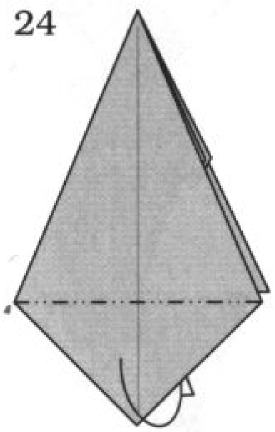
Fold one layer up.

23



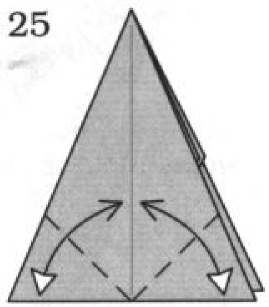
Turn the paper over.

24



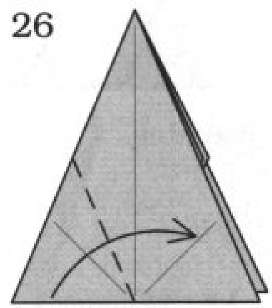
Mountain-fold the point up into the inside of the model.

25



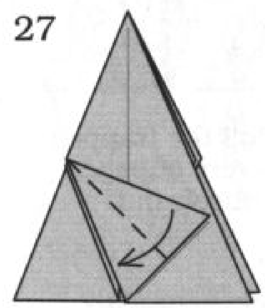
Fold and unfold.

26



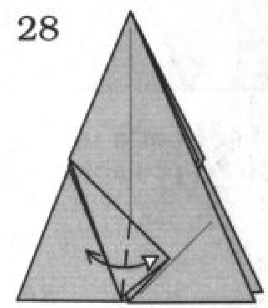
Fold the edge to lie along the crease.

27



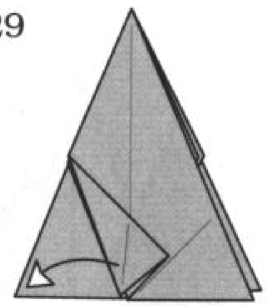
Fold down.

28



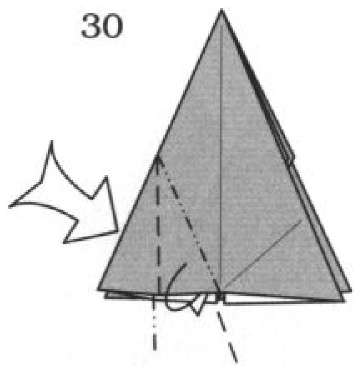
Fold and unfold.

29



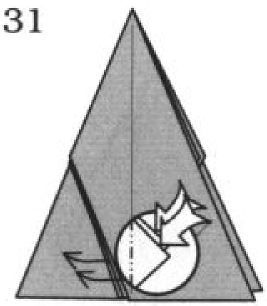
Unfold.

30



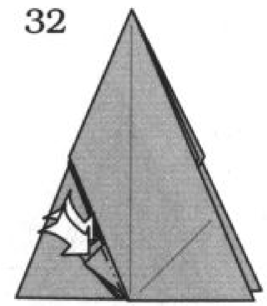
Crimp symmetrically.

31



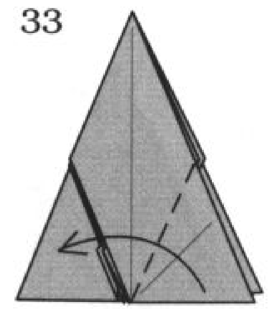
Reverse-fold both corners back to the outside on existing creases.

32



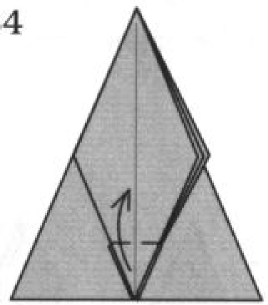
Reverse-fold both corners.

33



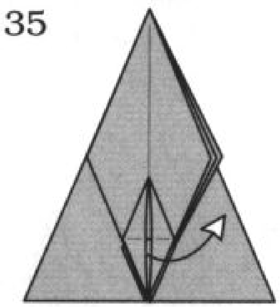
Repeat steps 26–32, on the right.

34



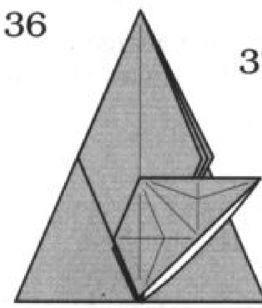
Fold one point up as far as possible.

35



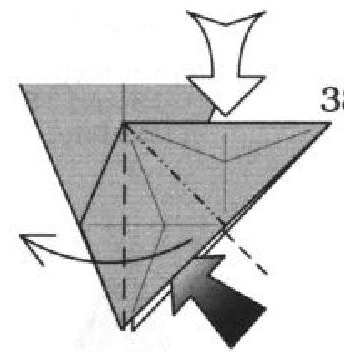
Pull the trapped layers of paper entirely out.

36



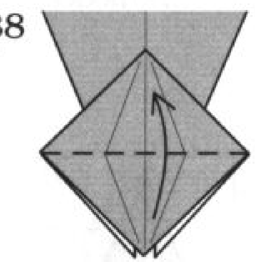
Like this.

37



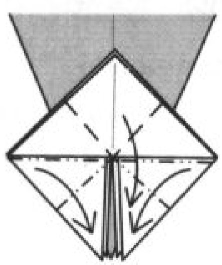
Enlarged view. Squash-fold the flap.

38



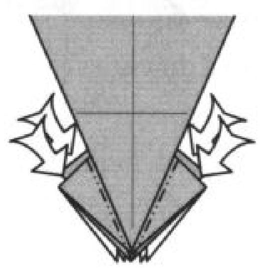
Fold one layer up.

39



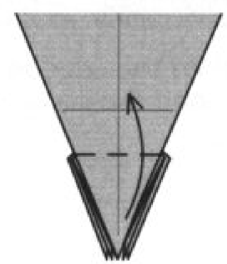
Form a Preliminary Fold.

40



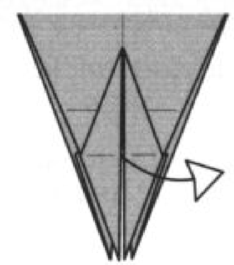
Reverse-fold four corners.

41



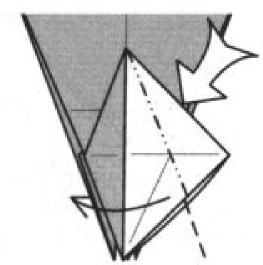
Fold one point up as far as possible.

42



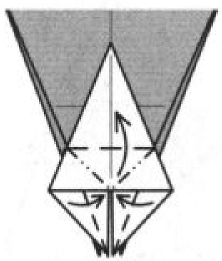
Pull the trapped layer out from the interior.

43



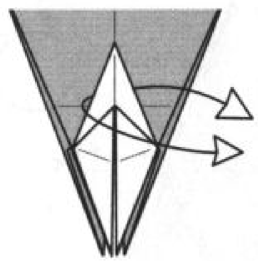
Squash-fold.

44



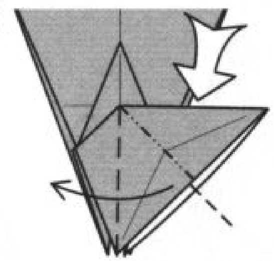
Petal-fold.

45



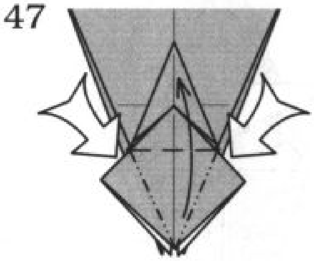
Unwrap the loose layer of paper.

46



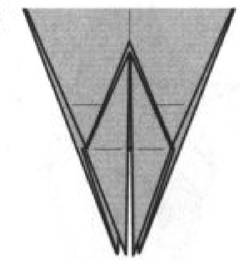
Squash-fold.

47



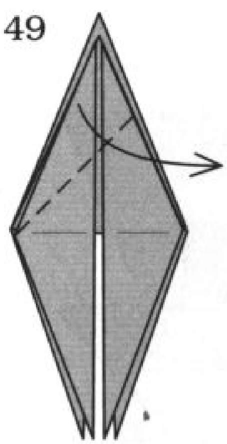
Petal-fold.

48



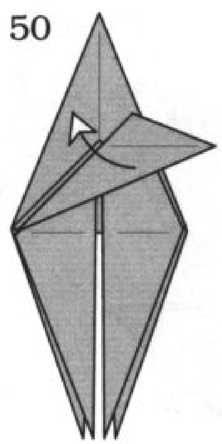
Like this.

49



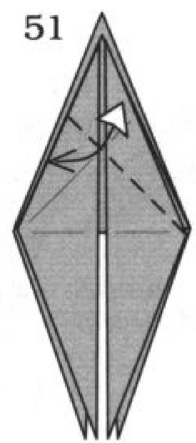
Enlarged view of the tip. Fold the tip down so that the crease lines up with the edge underneath.

50



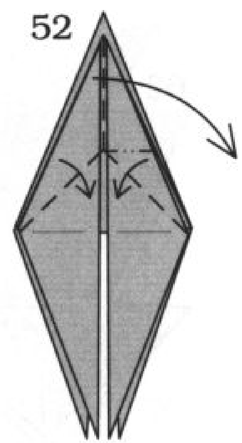
Unfold.

51



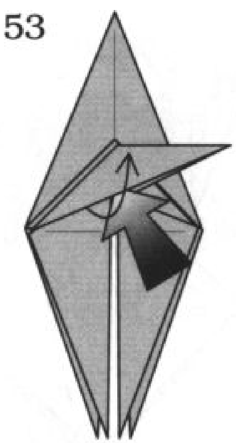
Fold and unfold.

52



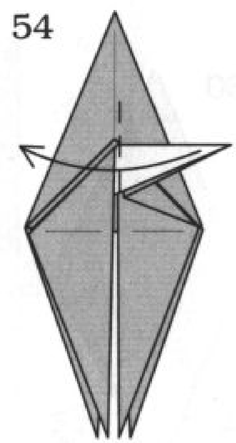
Rabbit-ear the flap using the creases you just made.

53



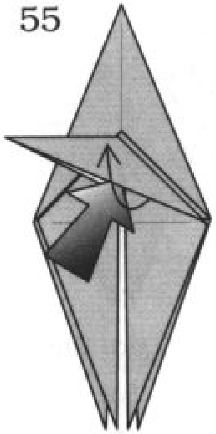
Wrap one layer of paper from inside to the outside.

54



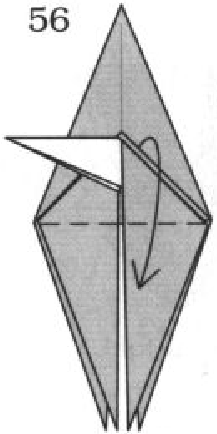
Fold the point over to the left.

55



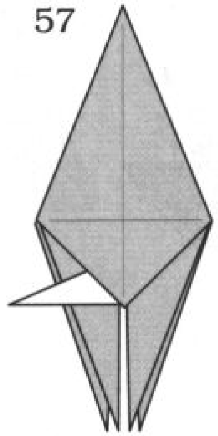
Repeat step 53.

56



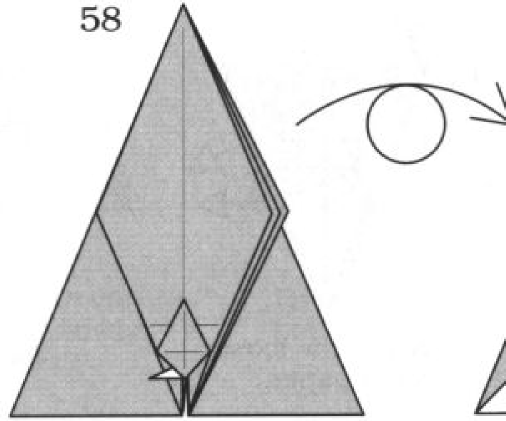
Fold all layers downward.

57



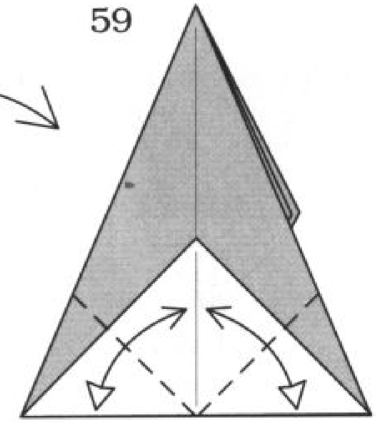
Like this.

58



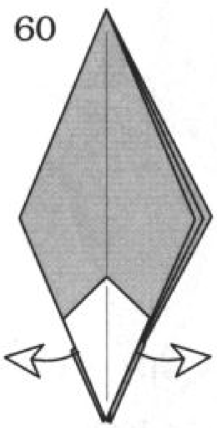
This is the entire model. Turn the paper over.

59



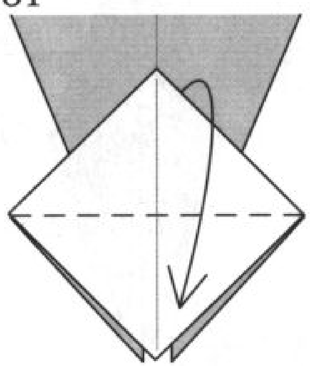
Repeat steps 25–33 on this side.

60



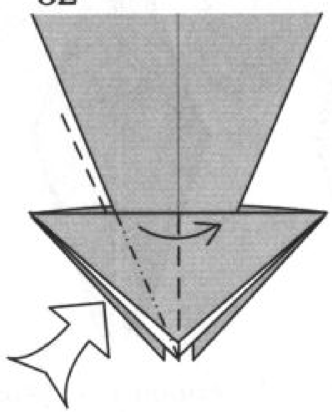
Pull out the loose paper.

61



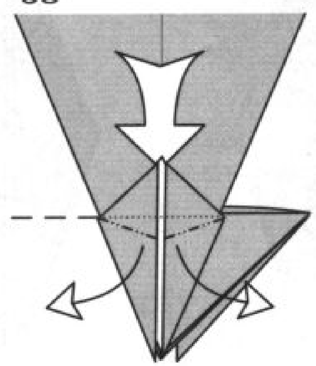
Fold one layer down.

62



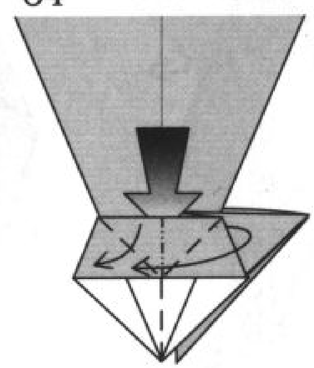
Squash-fold.

63



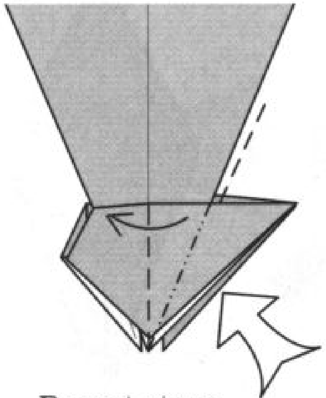
Squash-fold again.

64



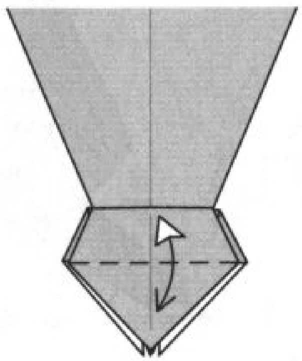
Close up, incorporating the reverse fold shown.

65



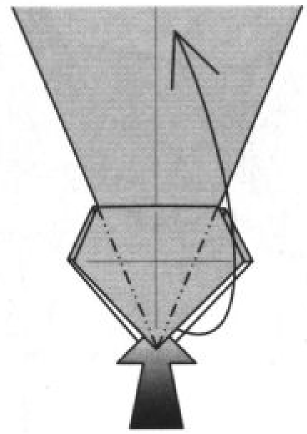
Repeat steps 62–64 on this side.

66



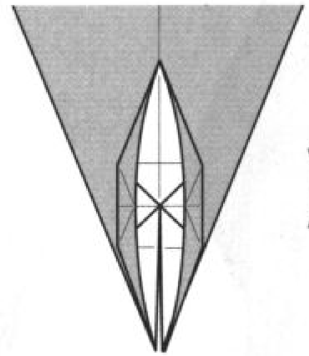
Fold and unfold the top.

67



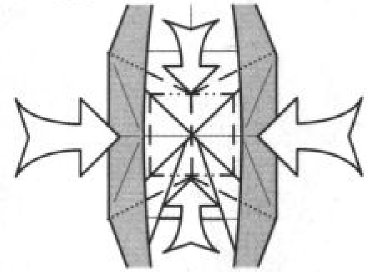
Grasp a single layer and pull it as far upward as you can.

68



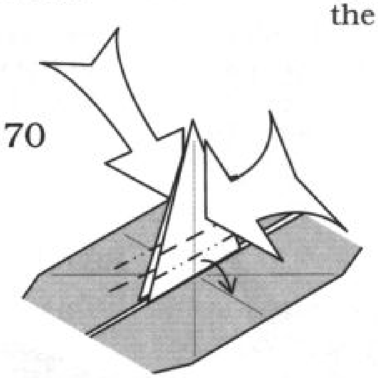
A white pyramid forms between the colored layers.

69



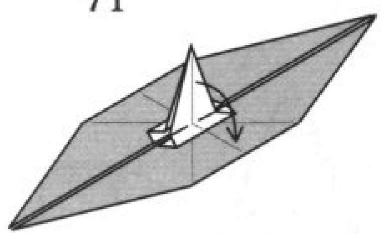
Enlarged view. Collapse the pyramid on the creases shown.

70



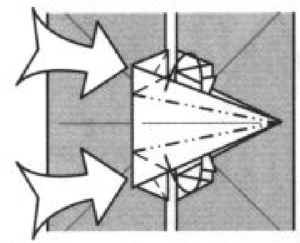
Crimp it symmetrically downward.

71



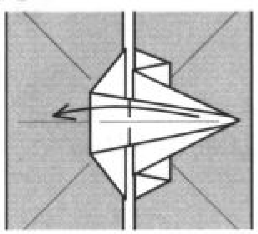
Swing the white point over to one side.

72



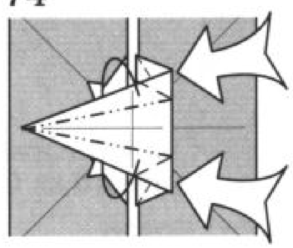
Enlarged view. Swivel-fold the edges inside.

73



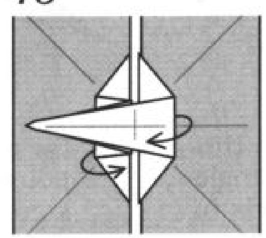
Fold the point back to the left.

74



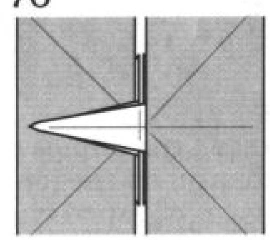
Repeat step 72 on this side.

75



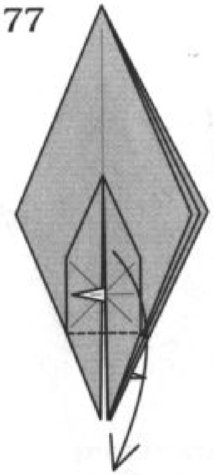
Tuck the edges under the colored layers.

76



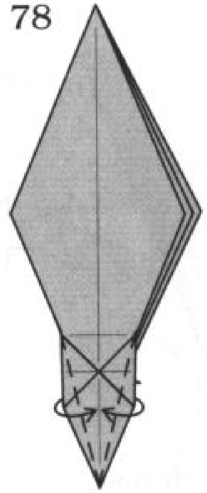
Like this.

77



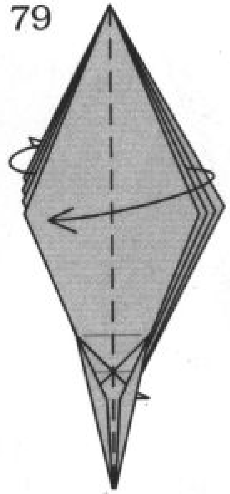
Fold the point downward.

78



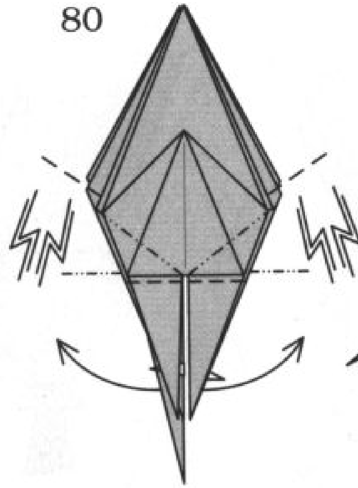
Fold the edges in to the center.

79



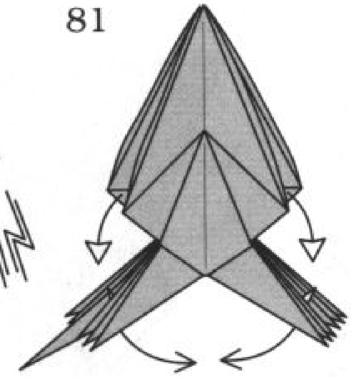
Fold two layers to the left in front and two to the right behind.

80



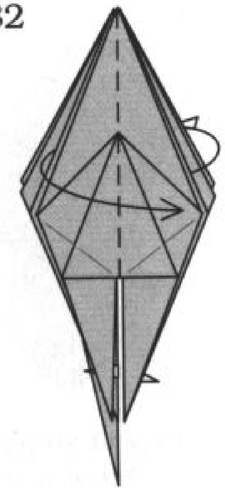
Crimp symmetrically through all layers.

81



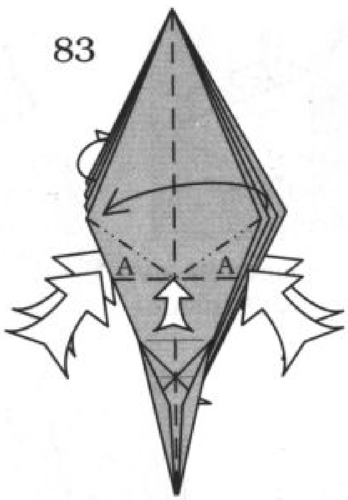
Undo the crimps.

82



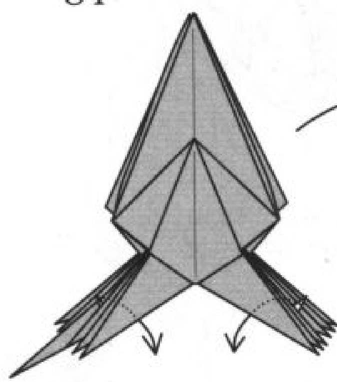
Return the paper to the configuration of step 79.

83



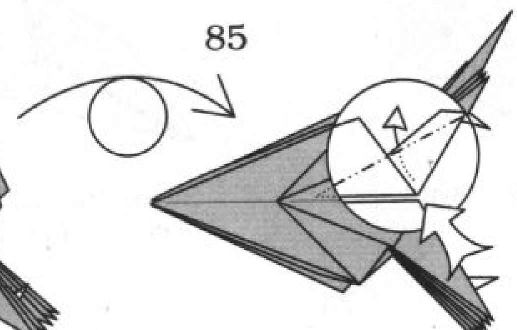
Refold the crimps of step 80 with this change; on the top and bottom single layers of paper, change valley folds to mountain folds and vice-versa. The effect is to sink the edges marked A into themselves (similarly behind).

84



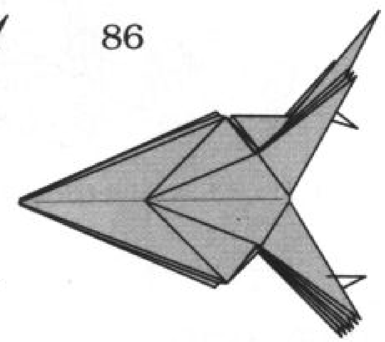
Swing the two white points (the results of steps 57 and 76) downward. Turn the paper over.

85



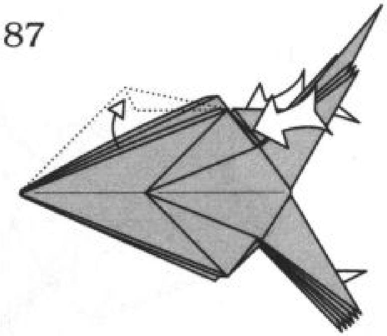
Sink the inside corner upward as far as possible.

86



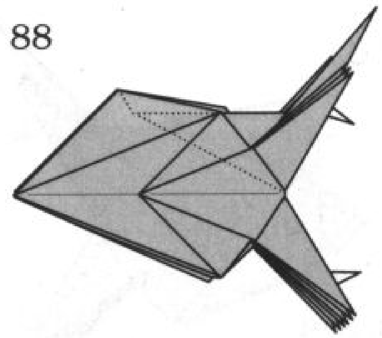
Like this.

87



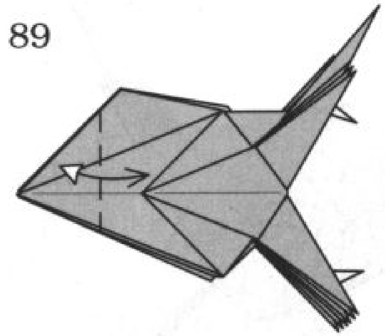
Pull out as much paper as possible; crimps at the white arrows disappear in the process.

88



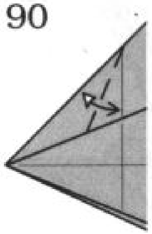
Like this. X-ray lines show hidden edges.

89



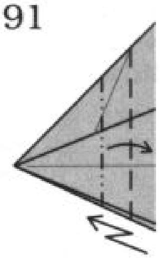
Fold and unfold (there's no reference point).

90



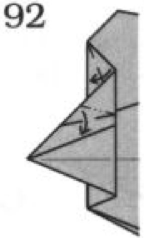
Enlarged view of tail. Crease the angle bisector.

91



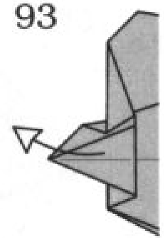
Pleat through all layers.

92



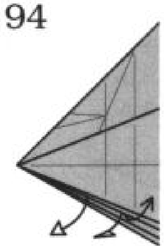
Swivel-fold.

93



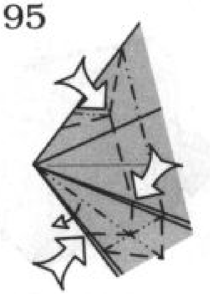
Unfold to step 90.

94



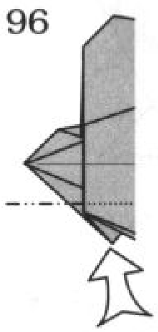
Spread the bottom layers symmetrically to form a three-sided pyramid.

95



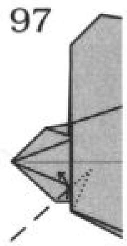
Carefully collapse the pyramid on the creases shown.

96



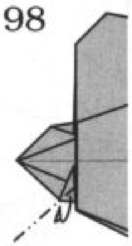
Sink this corner.

97



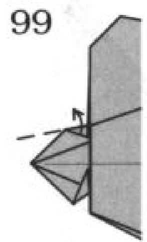
Swivel-fold the hidden corner.

98



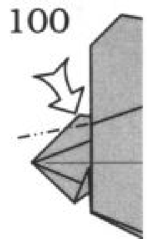
Repeat behind.

99



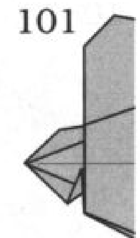
Fold upwards.

100



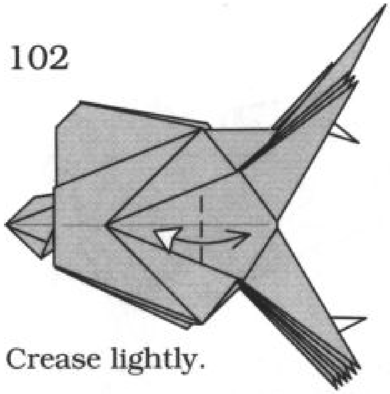
Sink.

101



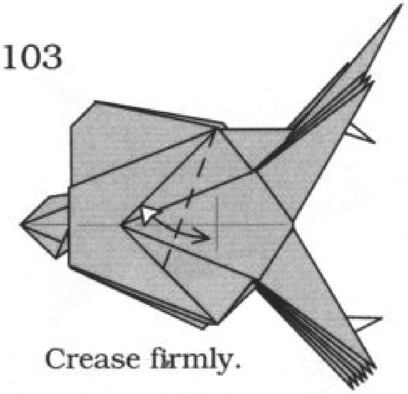
Like this.

102



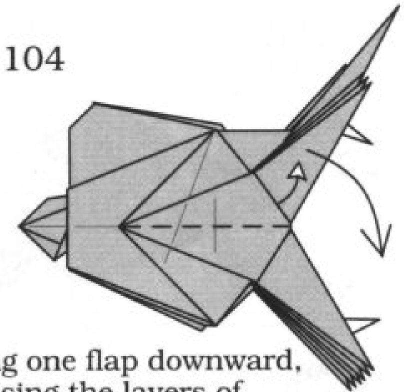
Crease lightly.

103



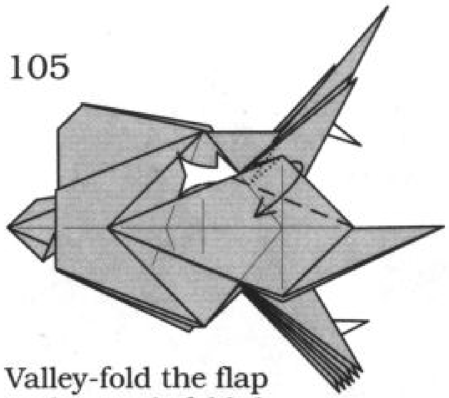
Crease firmly.

104



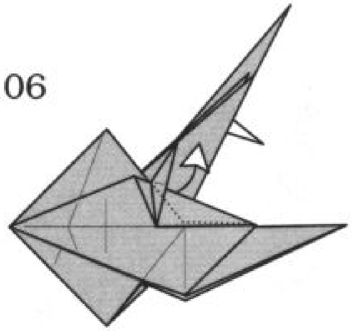
Swing one flap downward, releasing the layers of paper at the crimp.

105



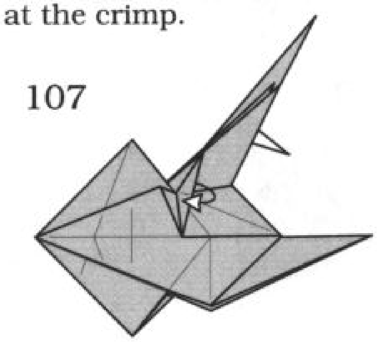
Valley-fold the flap and squash-fold the tiny gusset inside.

106



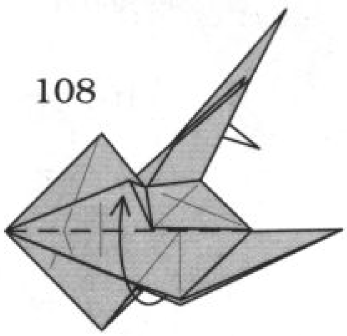
The body and tail are not shown for the next 11 steps. Pull out a single layer of paper.

107



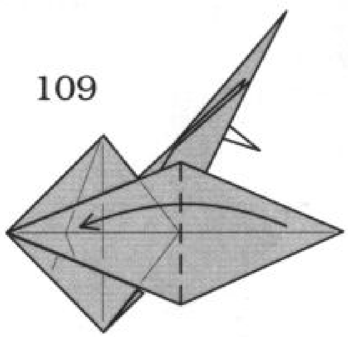
Pull out the layers from under the gusset.

108



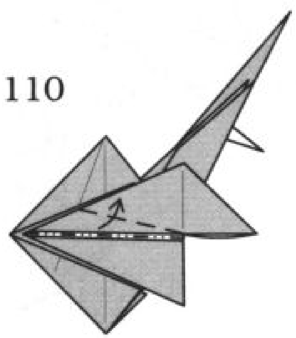
Fold one layer upward.

109



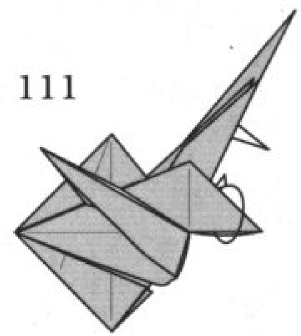
Fold the point over to the left.

110



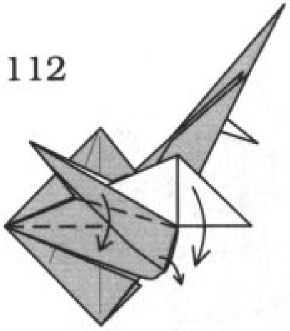
Pleat the top portion of the point; the bottom will not lie flat.

111



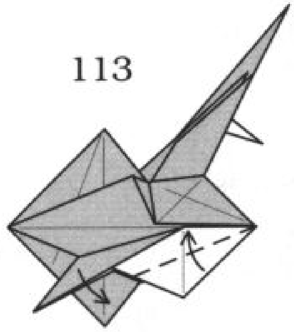
With the pleat in place, wrap one layer of paper from front to back.

112



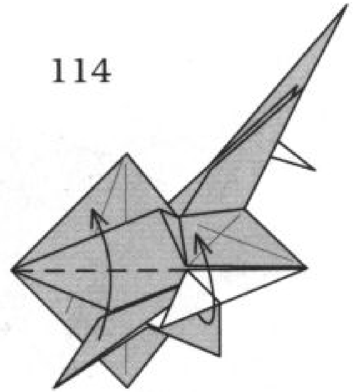
Close the model up, adding a second pleat.

113



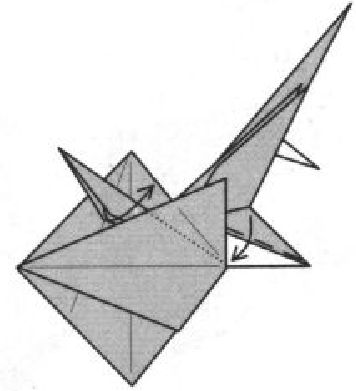
Shift the point slightly downward and fold the white edge upward.

114



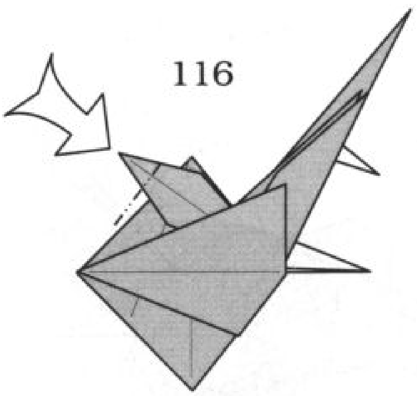
Close up the flap.

115



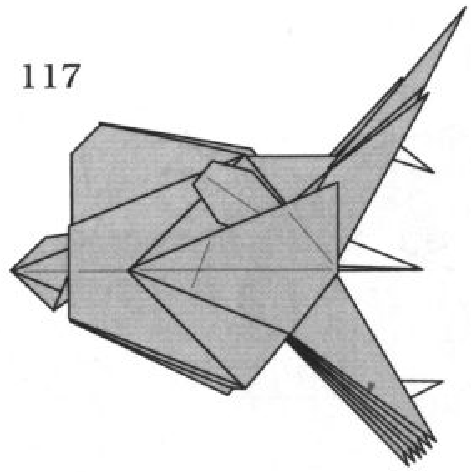
Open out the colored point and fold the single layer over the white point.

116



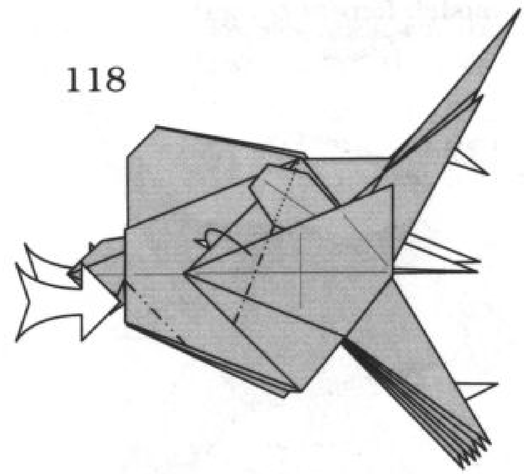
Sink the tip. This will be a fin.

117



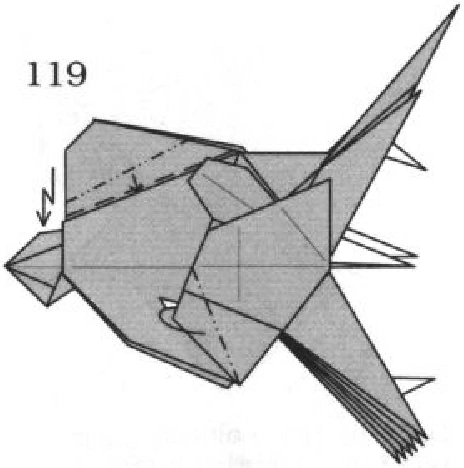
Repeat steps 102–116 on the other side of the model.

118



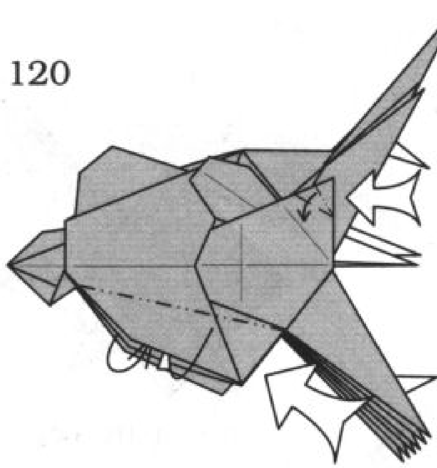
Reverse-fold the corner at the base of the tail. Mountain-fold the flap next to the fin. Repeat behind.

119



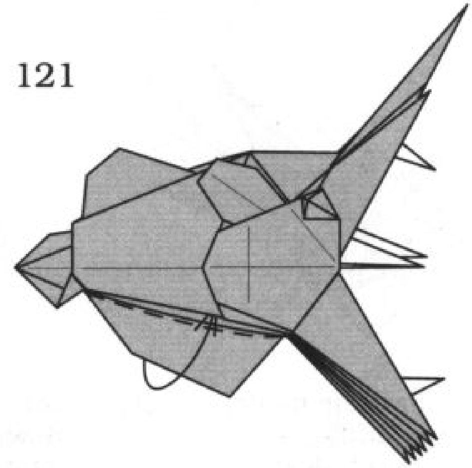
Pleat the top of the model and tuck it into the pocket shown. Mountain-fold the bottom of the model. Repeat behind.

120



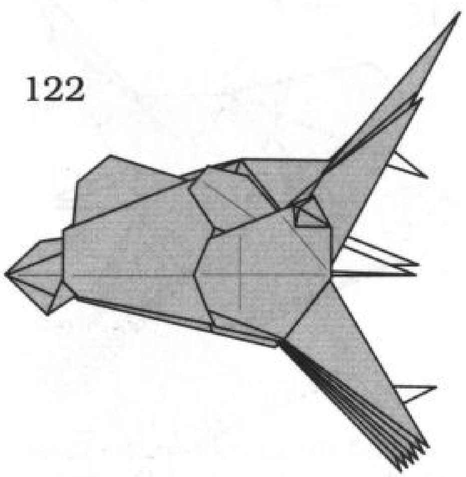
Reverse-fold a single layer.

121



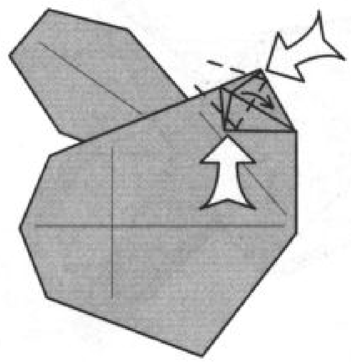
Tuck the remaining layers into the pocket you just made.

122



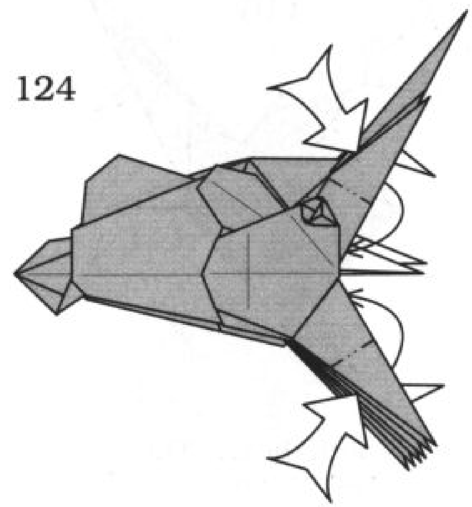
Like this.

123



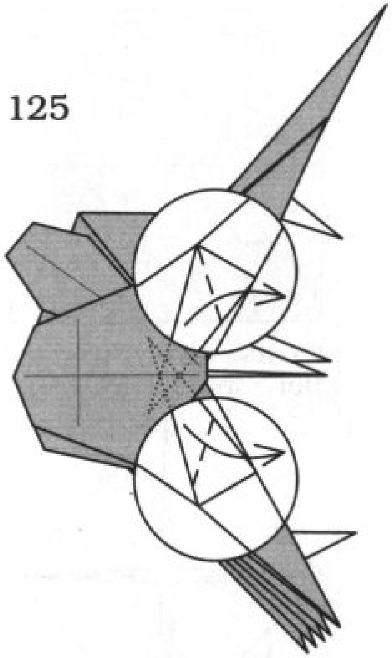
Enlarged view of fin and eye. Petal-fold. Repeat behind.

124



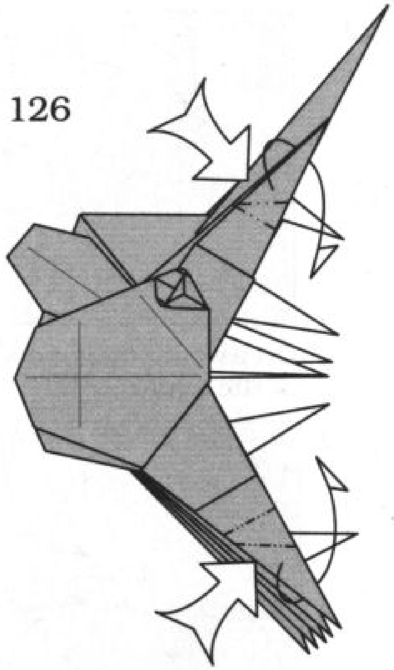
Reverse-fold the two front points into the model.

125



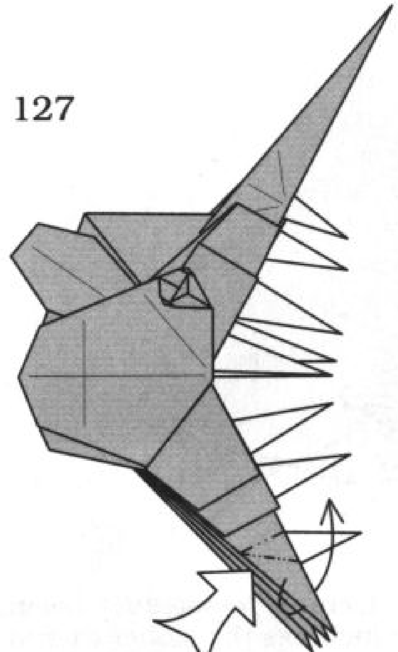
Enlarged view of head. Valley-fold the two points outward.

126



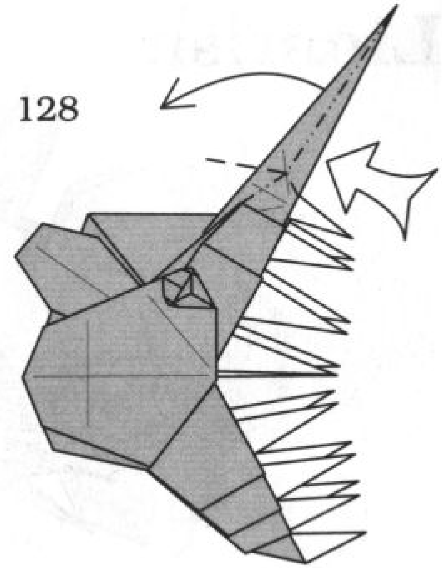
Repeat steps 124–125 on the next pair of points.

127



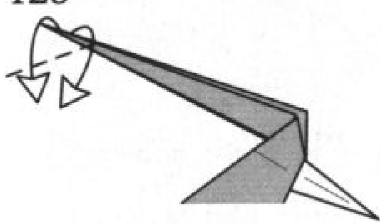
And again on a point at the bottom. Then repeat on all the points on the other side.

128



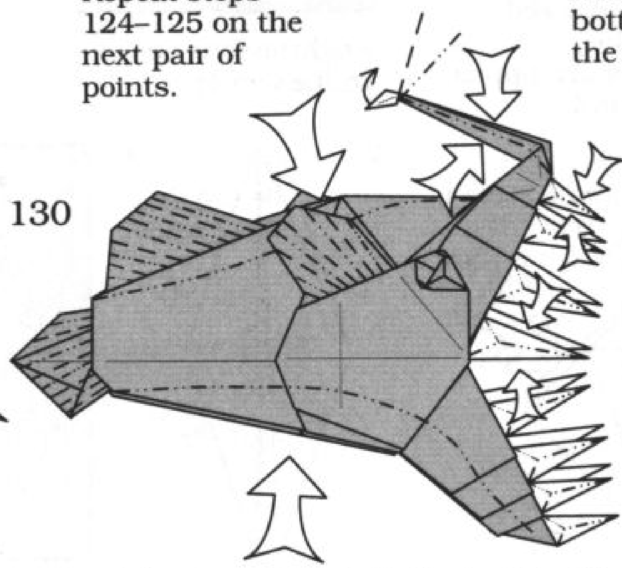
Double-rabbit-ear the long point at the top.

129



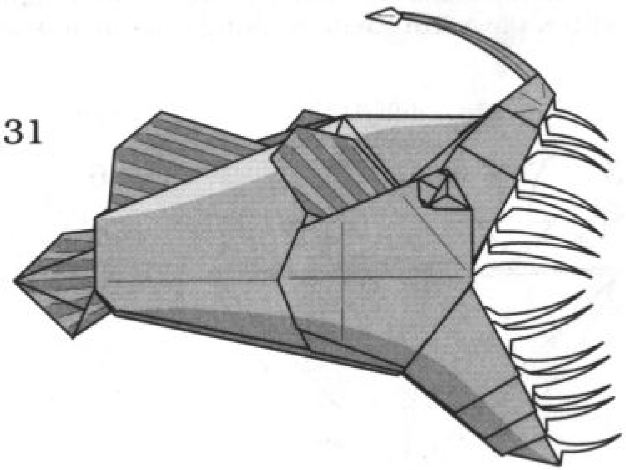
Enlarged view. Open out the layers at the tip.

130



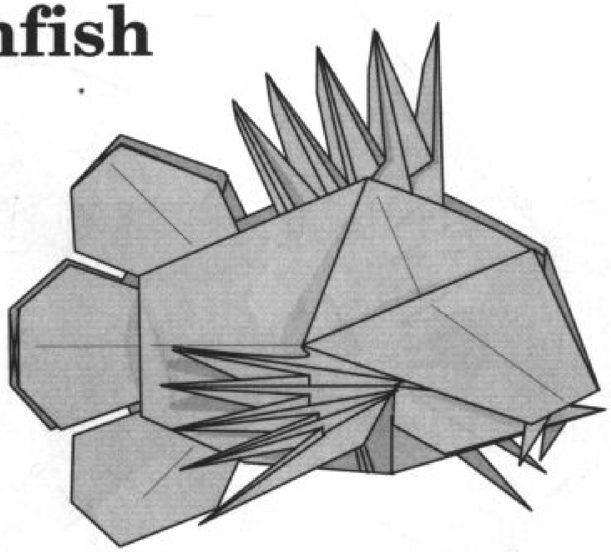
Final shaping. Round the body. Pleat the fins. Pinch the lure and each of the teeth. Curve the teeth slightly.

131



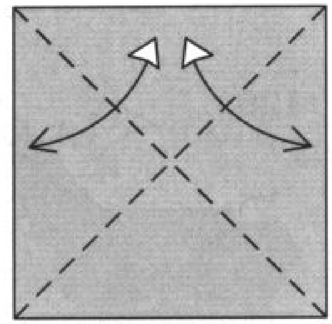
Blackdevil Angler

Lionfish



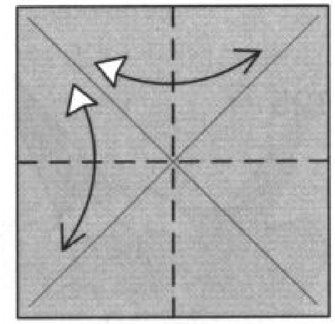
There are several species of lionfish (genus *Pterois*); they belong to the family *Scorpionidae*, which also includes the stonefish and scorpionfish. The lionfish lives in deep water but close to shore in the region along the Atlantic shore, where it ambushes smaller fish from its rocky hiding places. The lionfish is distinctively colored with red and white stripes, making it highly visible on the reefs where it makes its home. However, its long dorsal spines are tipped with a powerful toxin, making it as deadly as it is beautiful.

1



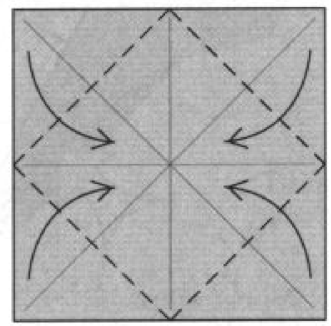
Crease the diagonals of the square.

2



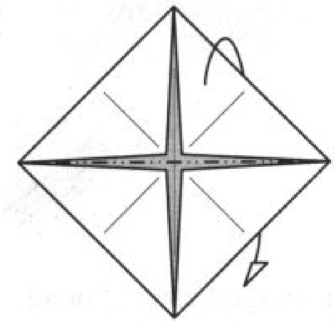
Crease it vertically and horizontally.

3



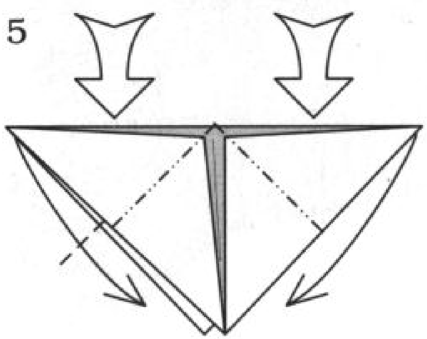
Fold the four corners to the center.

4



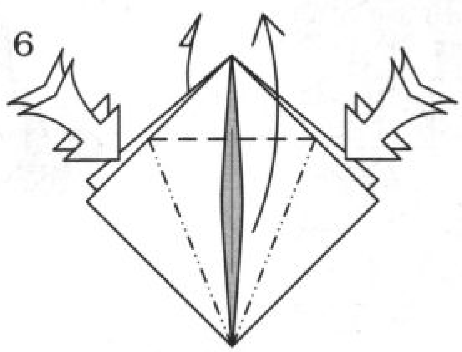
Mountain-fold the square in half.

5



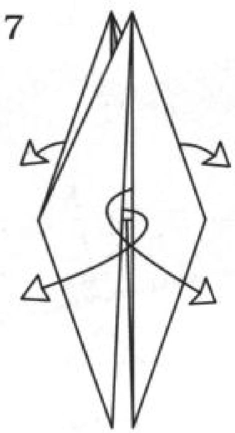
Reverse-fold the corners down to make a Preliminary Fold.

6



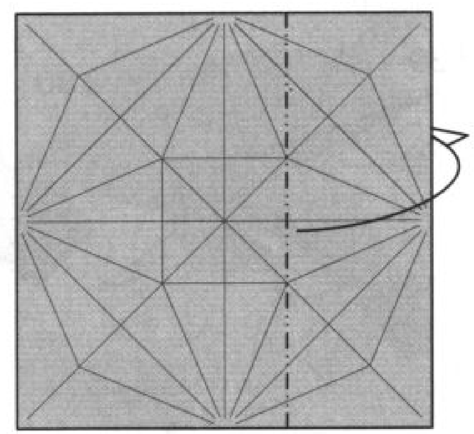
Petal-fold the model to make a Bird Base.

7



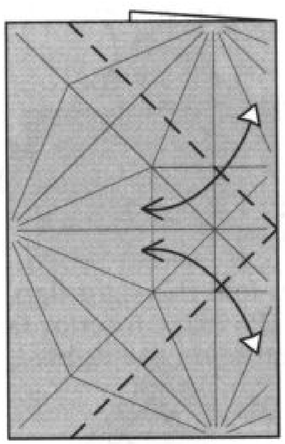
Unfold the paper completely.

8



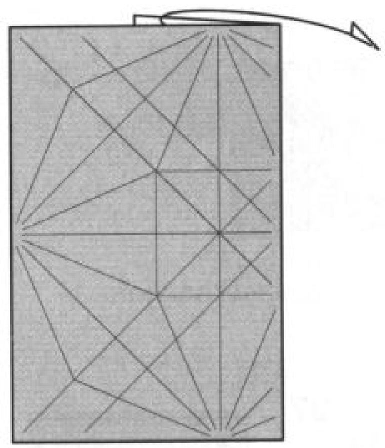
Fold the right side of the model behind.

9



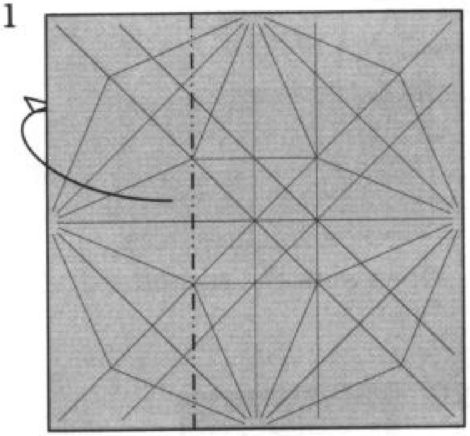
Fold and unfold.

10



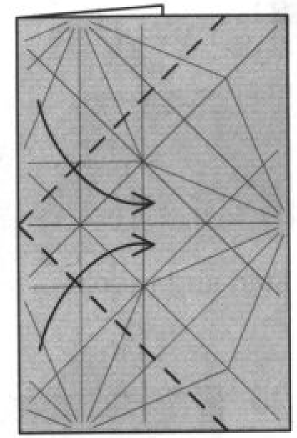
Unfold.

11



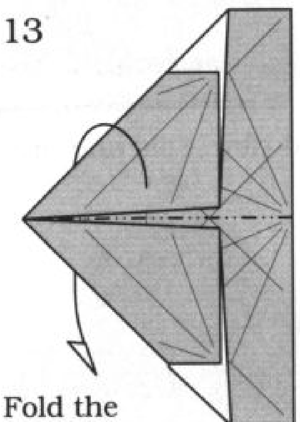
Fold the left side behind.

12



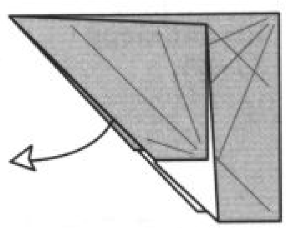
Fold like step 9, but don't unfold.

13



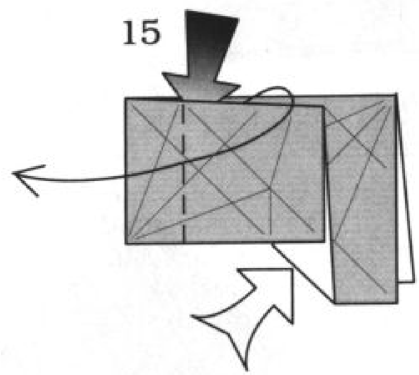
Fold the paper in half.

14



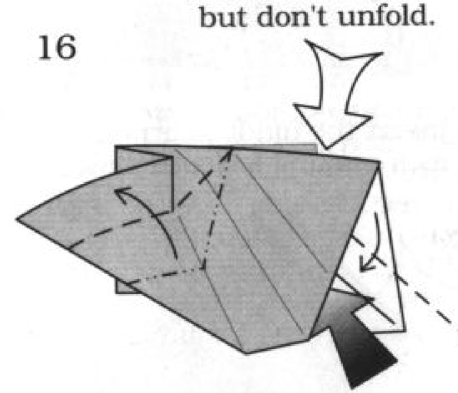
Pull out the loose paper.

15



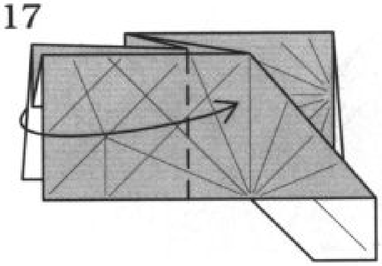
Fold a double layer of paper over on the vertical valley fold (the model will not lie flat).

16



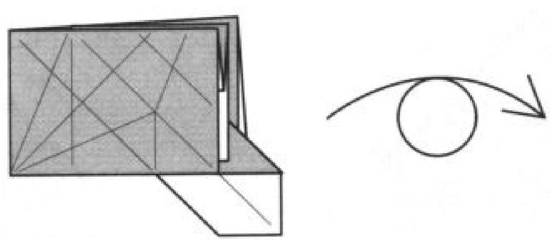
Squash-fold this corner down.

17



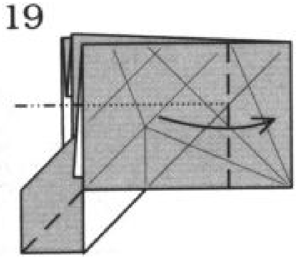
Fold the left flap back to the right.

18



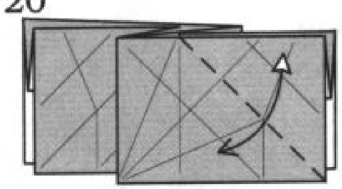
Turn the paper over.

19



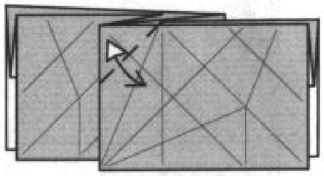
Repeat steps 15–16 on this side.

20



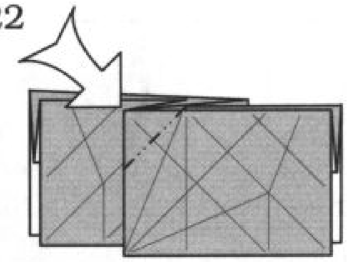
Fold and unfold.

21



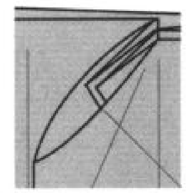
Fold and unfold.

22



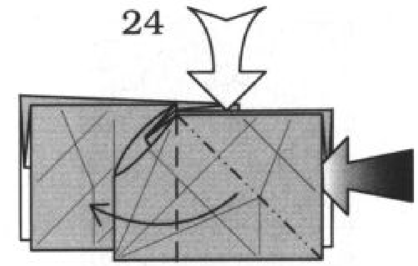
Open-sink the corner.

23



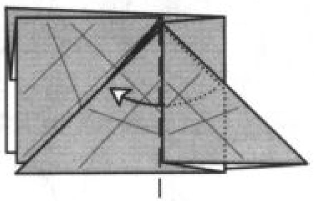
Close-up view of the sink.

24



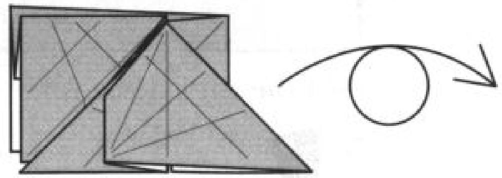
Squash-fold the right flap, letting the extra interior layers of paper lie on the right.

25



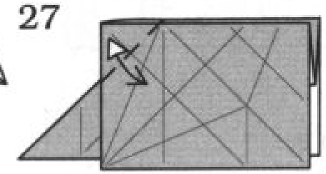
Invert the hidden corner, as if making a closed sink.

26



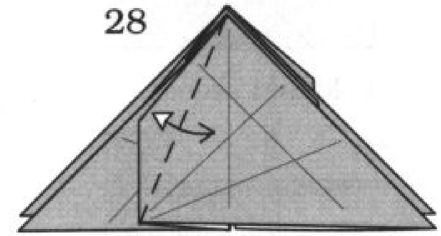
Like this. Turn the paper over.

27



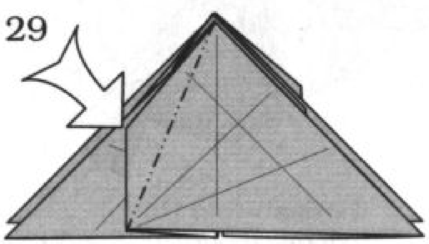
Repeat steps 21–25.

28



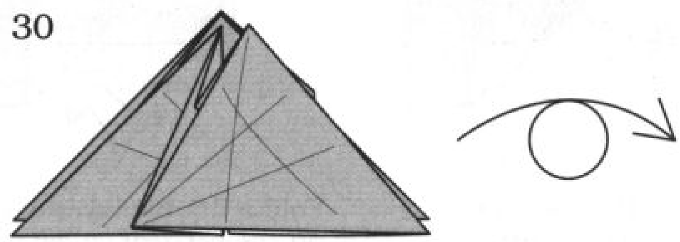
Enlarged view. Fold and unfold.

29



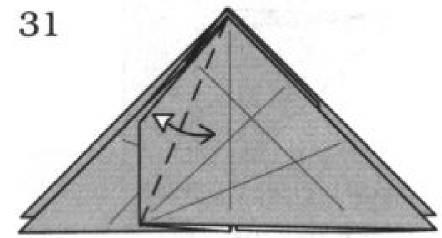
Open-sink the corner.

30



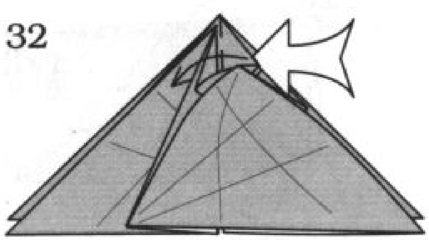
Like this. Turn the paper over.

31



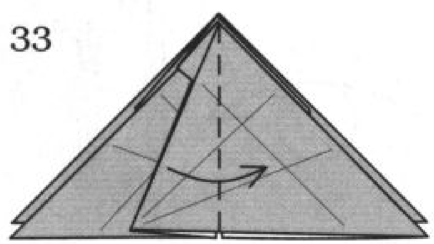
Repeat steps 28–29.

32



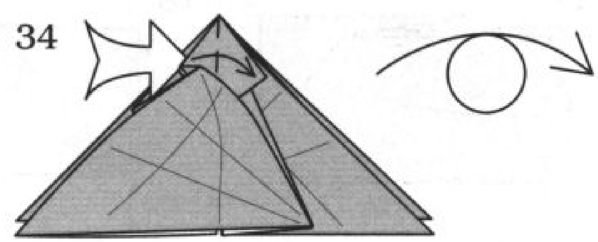
Reverse-fold a double layer of paper to the left.

33



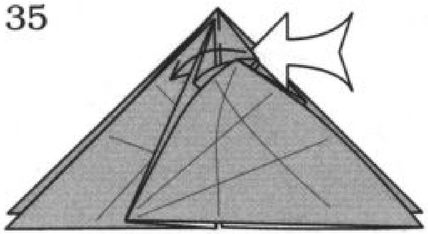
Fold one flap to the right.

34



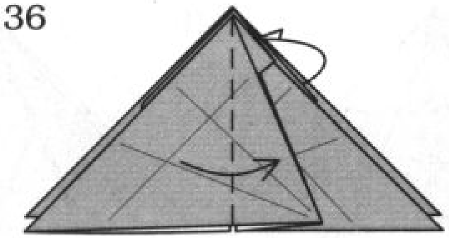
Repeat step 32 here and turn the paper over.

35



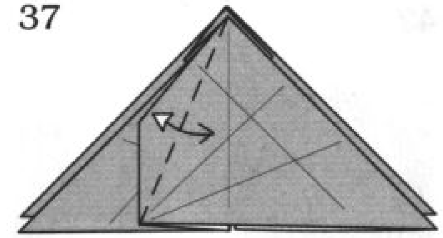
Repeat steps 32–34 on this side.

36



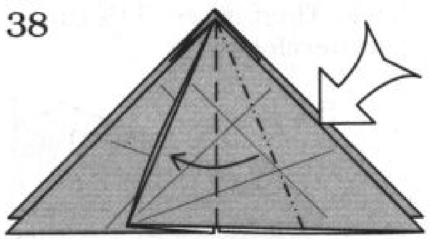
Fold one layer over to the right in front and one to the left in back.

37



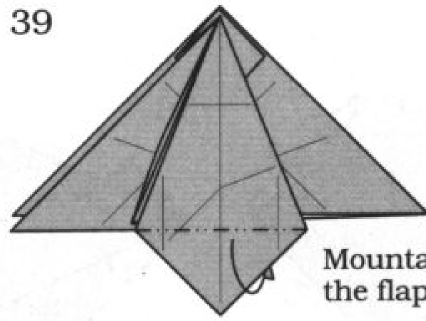
Repeat steps 28–29 here and behind.

38



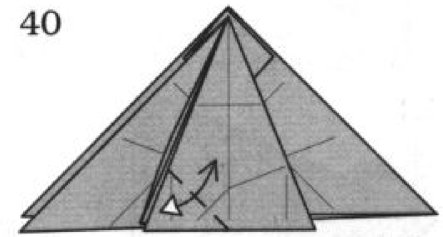
Squash-fold.

39



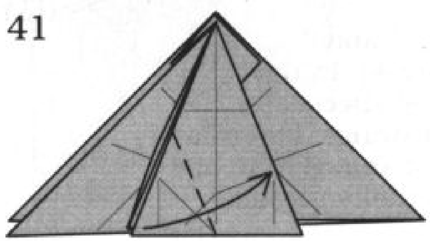
Mountain-fold the flap inside.

40



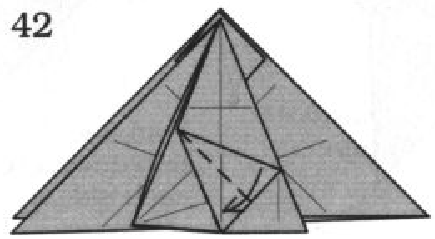
Fold and unfold.

41



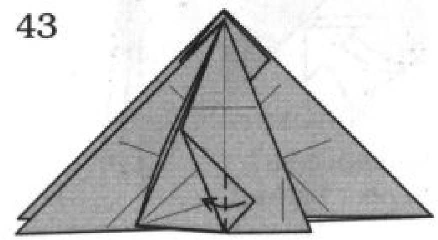
Fold this corner up to the right.

42



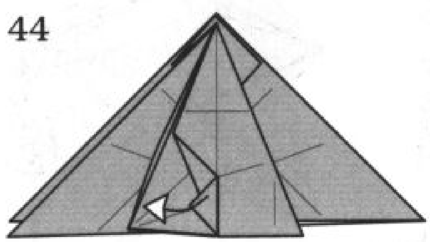
Fold it back down to the bottom.

43



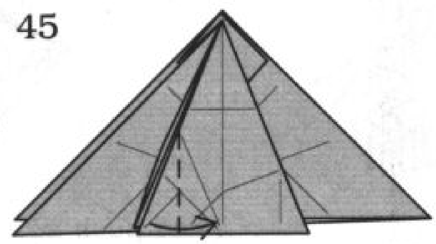
Fold the corner over to the side.

44



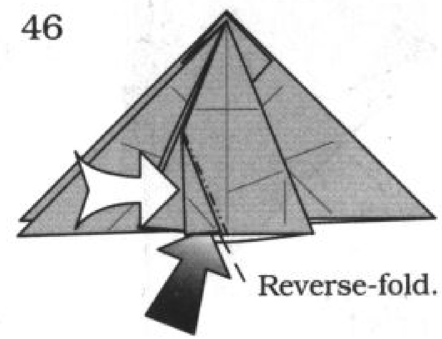
Unfold to step 40.

45



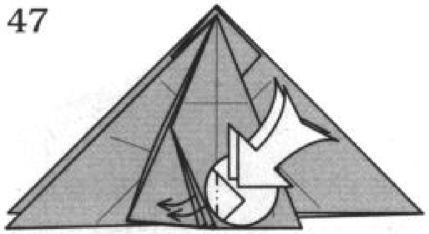
Fold the corner in to the center.

46



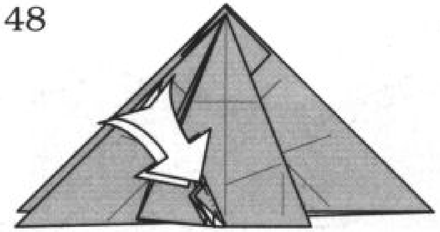
Reverse-fold.

47



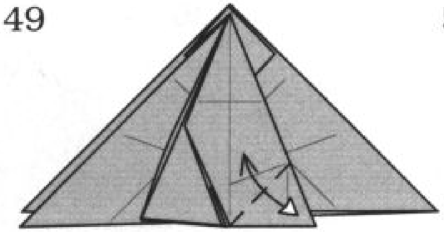
Reverse-fold both hidden corners back out.

48



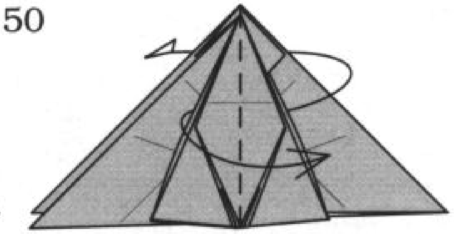
Reverse-fold all layers.

49



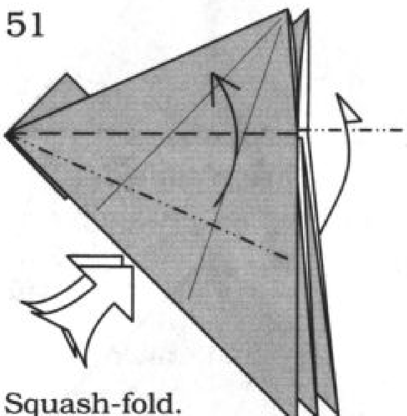
Repeat steps 40–48 on the right.

50



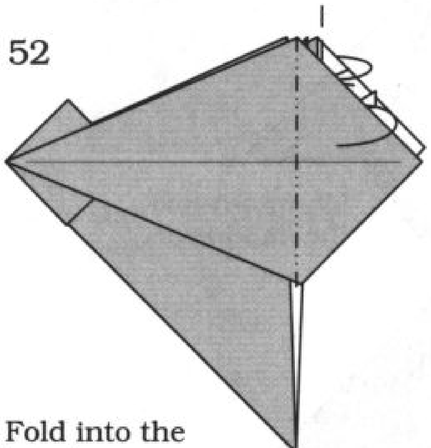
Fold all of the short flaps to the right in front and all of the long flaps to the left in back. Then rotate 1/4 turn counterclockwise.

51



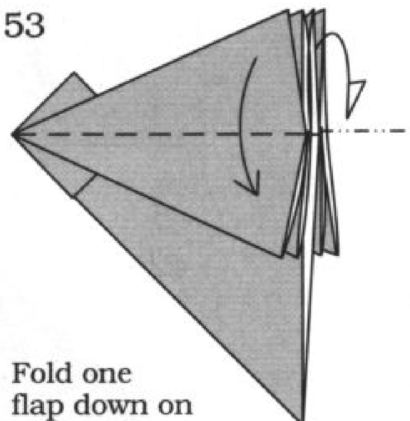
Squash-fold. Repeat behind.

52



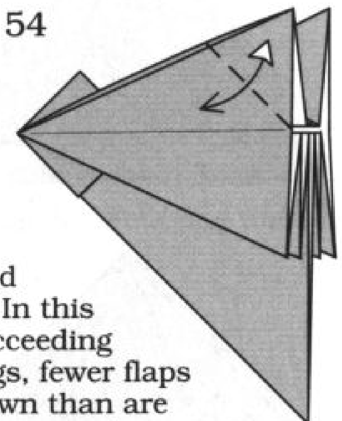
Fold into the interior.

53



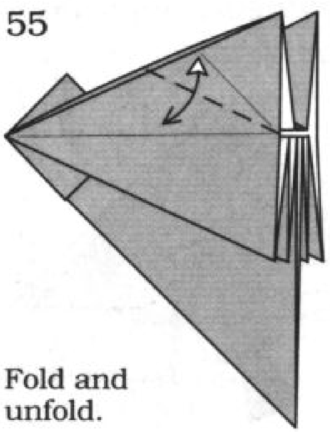
Fold one flap down on each side.

54



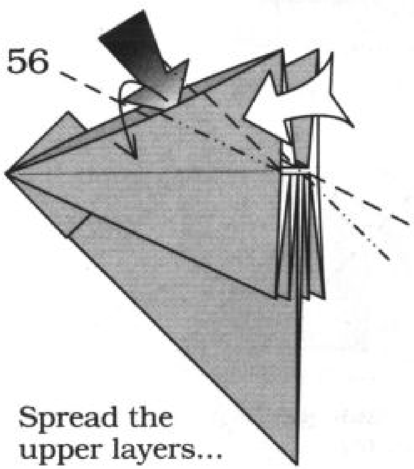
Fold and unfold. In this and succeeding drawings, fewer flaps are shown than are actually present.

55



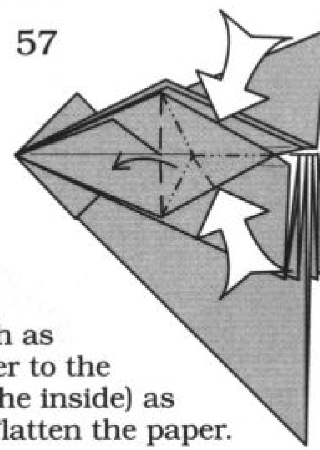
Fold and unfold.

56



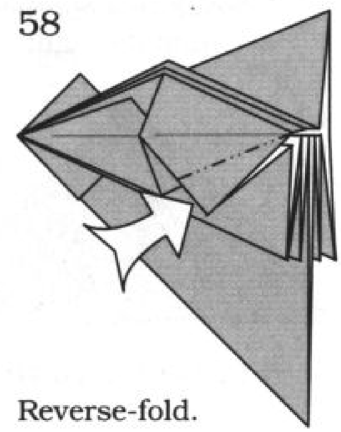
Spread the upper layers...

57



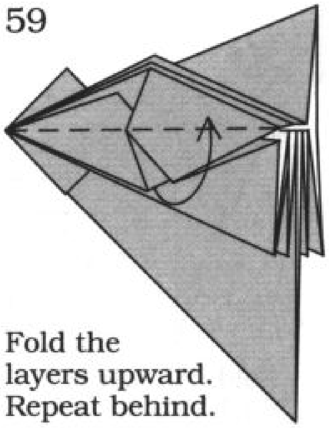
...and push as much paper to the left (from the inside) as possible. Flatten the paper.

58



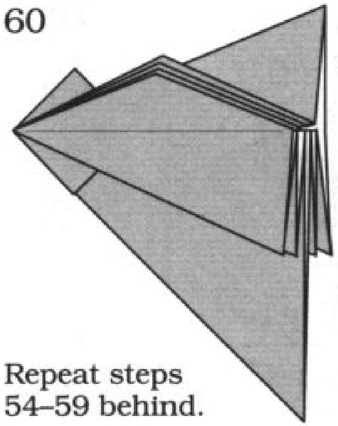
Reverse-fold.

59



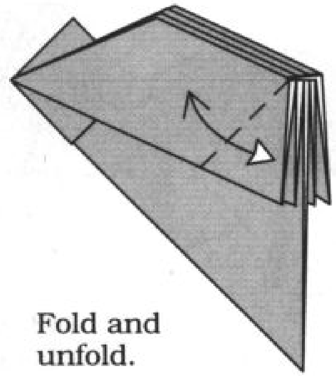
Fold the
layers upward.
Repeat behind.

60



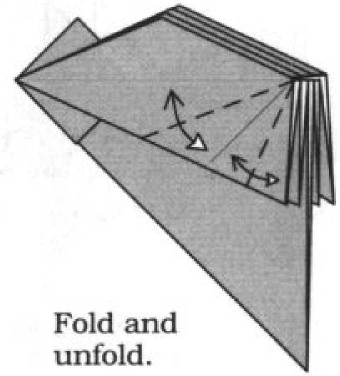
Repeat steps
54–59 behind.

61



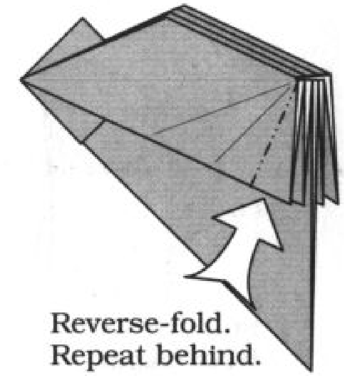
Fold and
unfold.

62



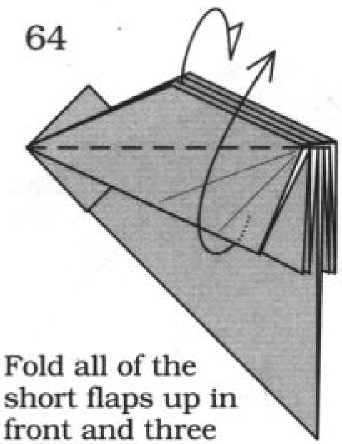
Fold and
unfold.

63



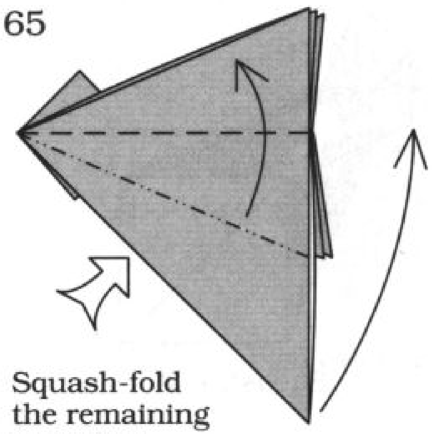
Reverse-fold.
Repeat behind.

64



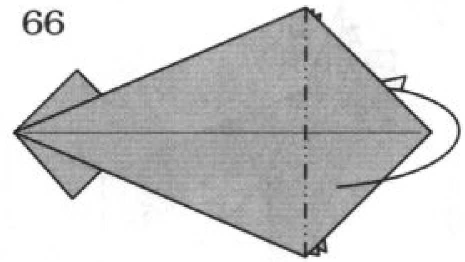
Fold all of the
short flaps up in
front and three
down in back.

65



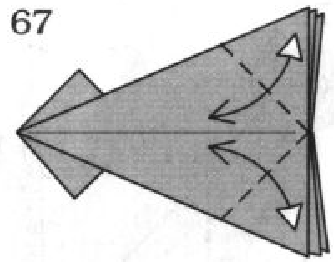
Squash-fold
the remaining
large flap.

66



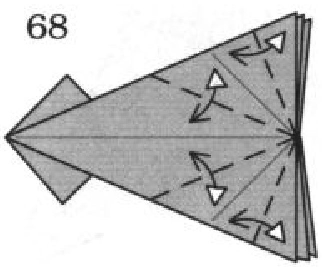
Mountain-fold the tip into
the interior of the model.

67



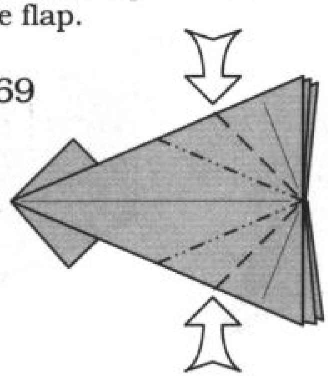
Fold and unfold.

68



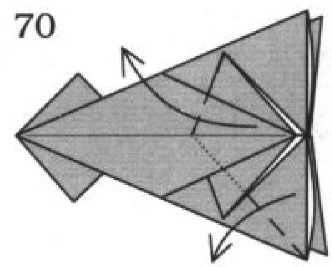
Fold and unfold.

69



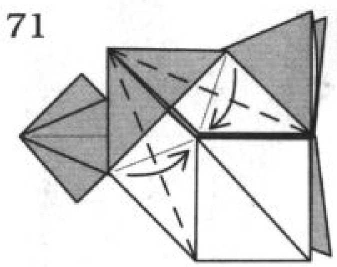
Crimp, using the existing creases.

70



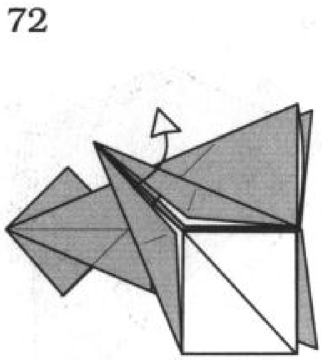
Fold the right point
upward, opening out
the model.

71



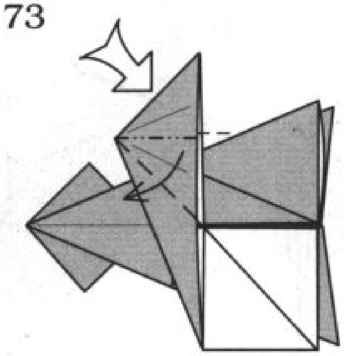
Fold the edges in to
the diagonal.

72



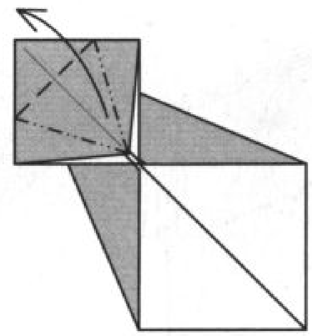
Pull out some loose paper.

73



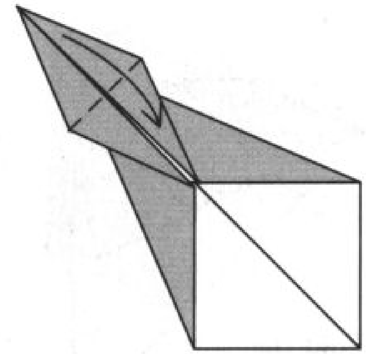
Squash-fold.

74



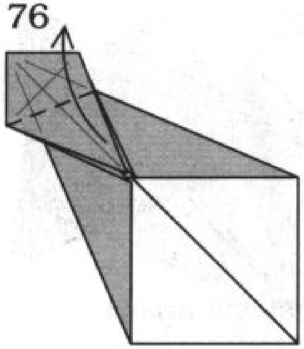
Enlarged view. Petal-fold.

75



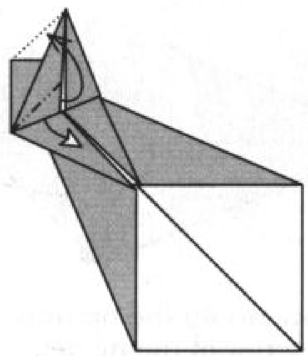
Fold the corner back down.

76



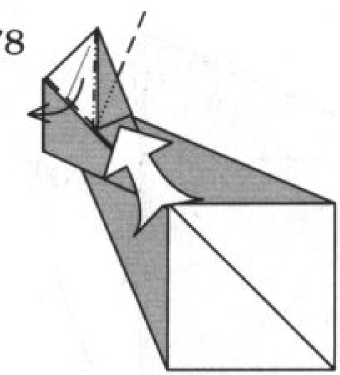
Fold the tip up to the right.

77



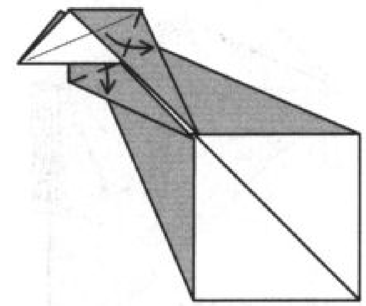
Pull out the loose paper.

78



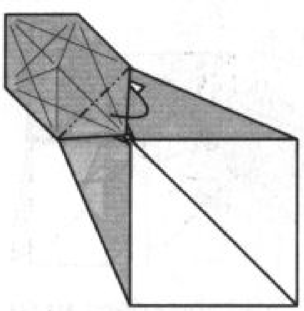
Squash-fold.

79



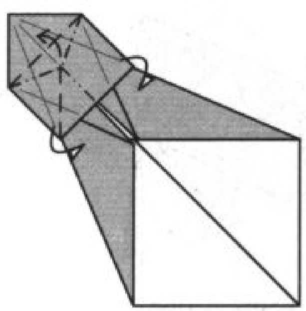
Open the flap out.

80



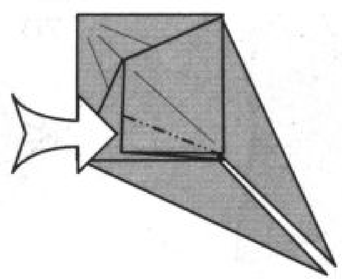
Mountain-fold underneath.

81



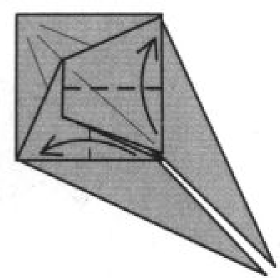
Re-form, using the existing creases.

82



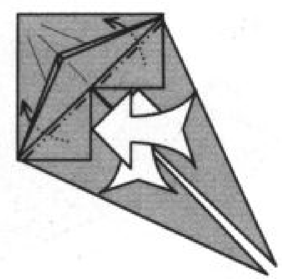
Enlarged view. Reverse-fold the corner.

83



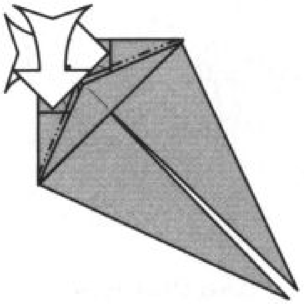
Spread the two points apart.

84



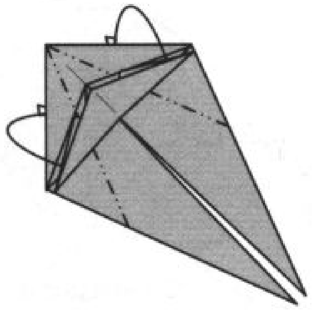
Reverse-fold the bottom corners.

85



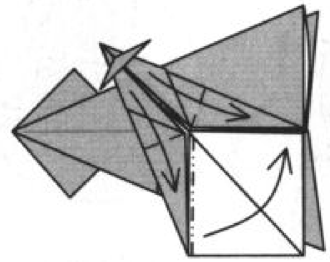
Reverse-fold the corners.

86



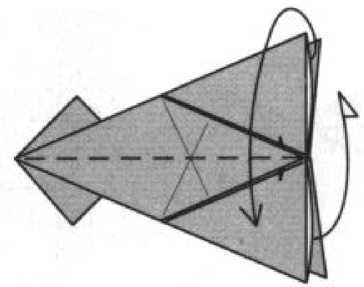
Mountain-fold the blunt corners behind.

87



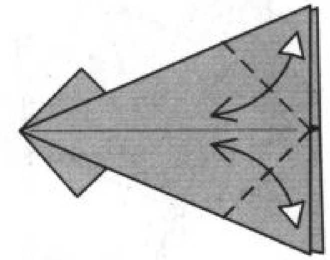
Fold the top corner down and close it up.

88



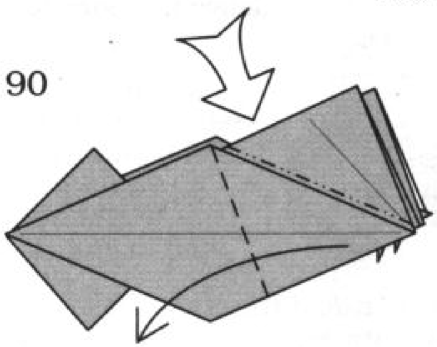
Fold one large flap down in front and one up in back.

89



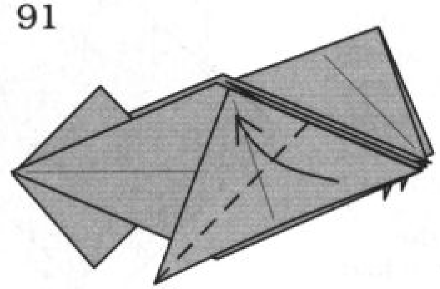
Repeat steps 40–49 here and on the back.

90



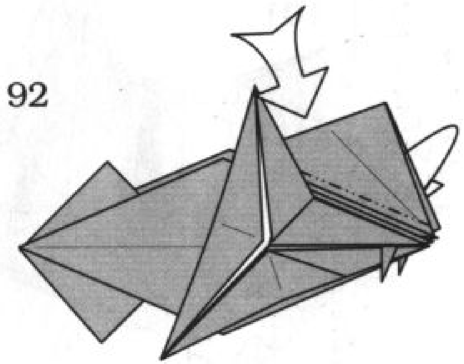
Squash-fold.

91



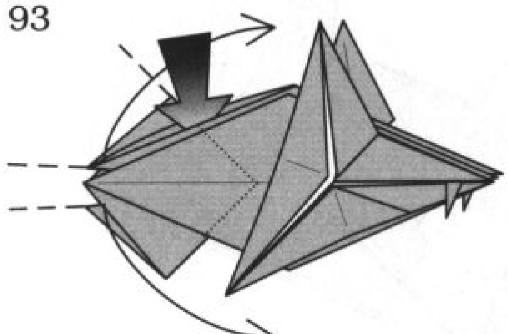
Fold a single point upward.

92



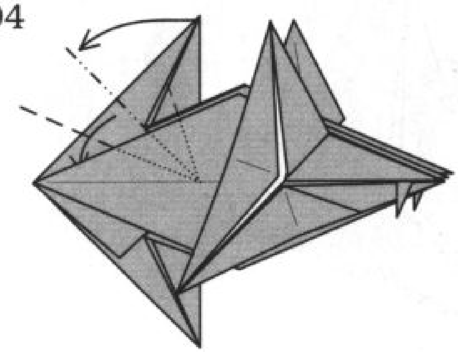
Repeat steps 90–91 on the back.

93



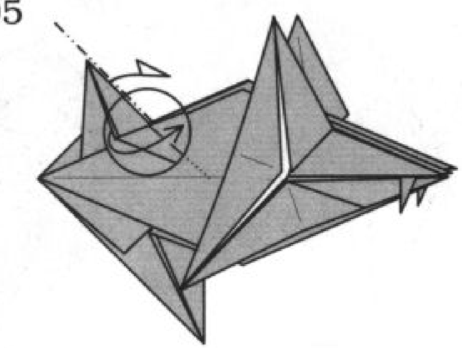
Reverse-fold two points at the left upward and downward, respectively.

94



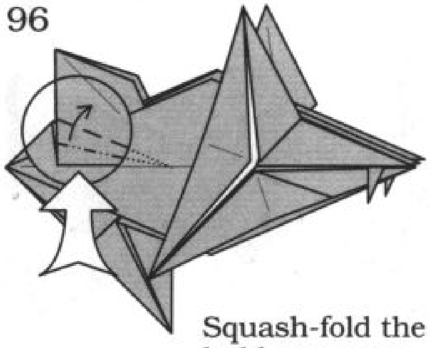
Pleat the upper point.

95



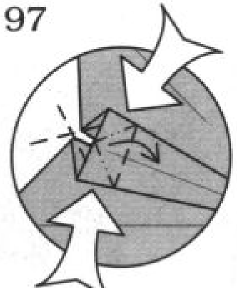
Fold all the layers on the front of the point to the right; repeat behind.

96



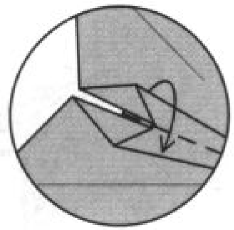
Squash-fold the hidden corner.

97



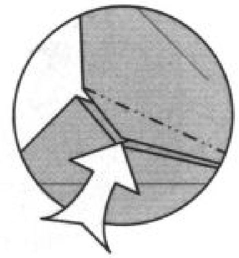
Enlarged view. Petal-fold.

98



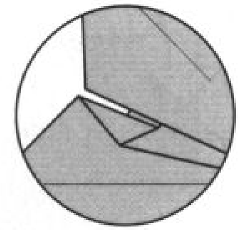
Fold one flap down.

99



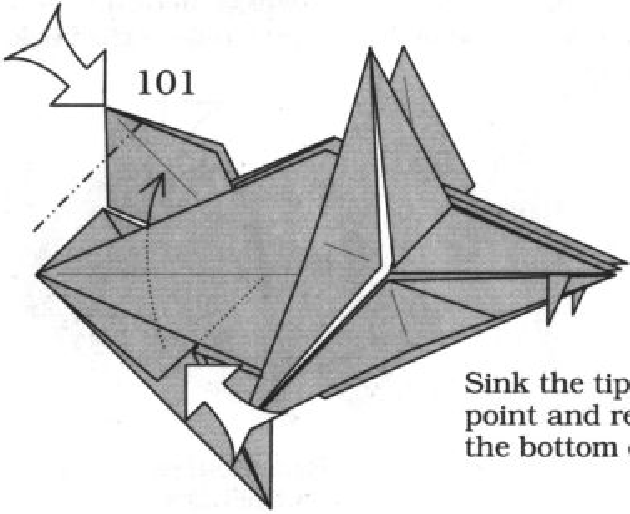
Closed-sink the point...

100



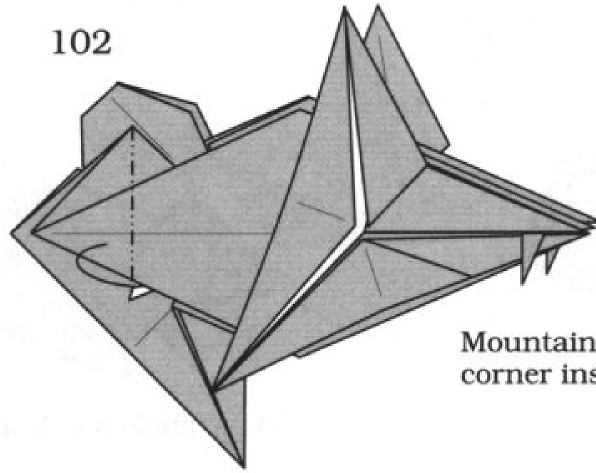
...so that it is hidden, like this. If this is too difficult, you can leave it at step 98.

101



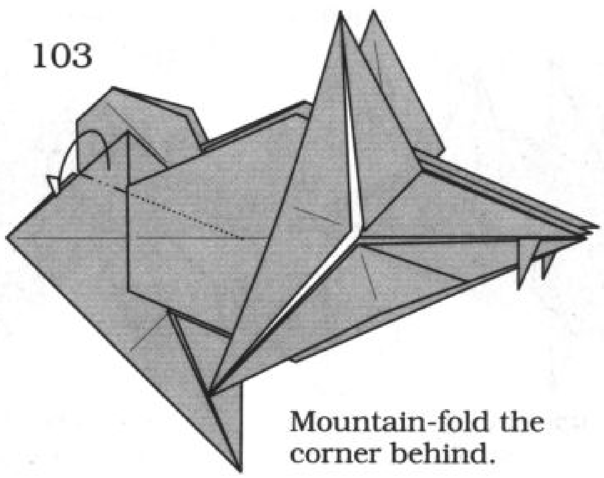
Sink the tip of the point and reverse-fold the bottom corner up.

102



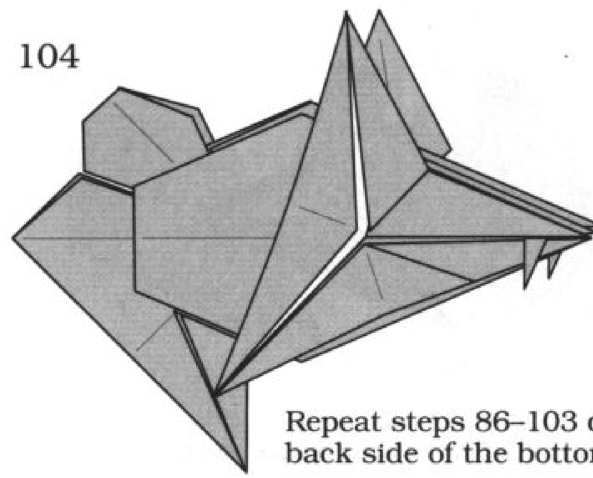
Mountain-fold the corner inside.

103



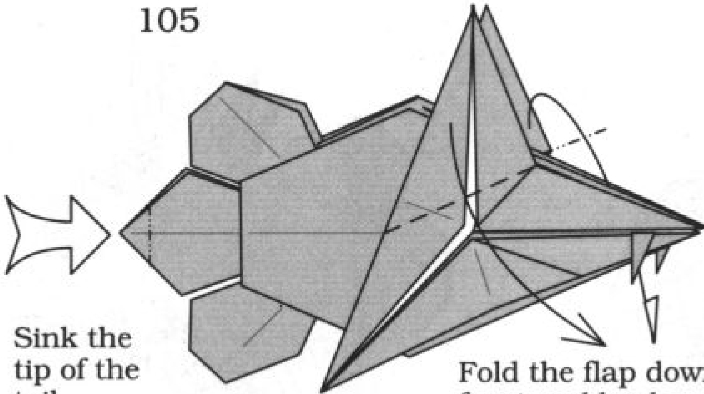
Mountain-fold the corner behind.

104



Repeat steps 86–103 on the back side of the bottom.

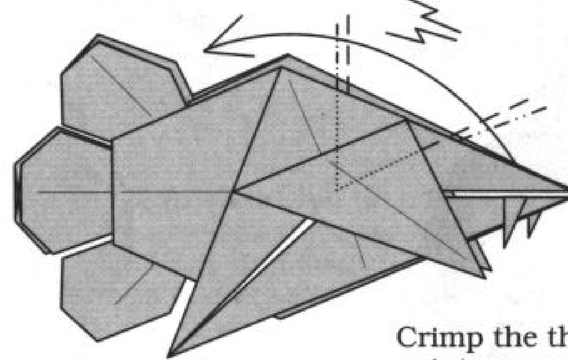
105



Sink the tip of the tail.

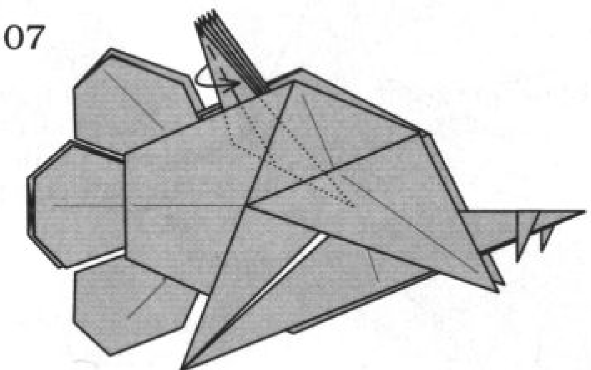
Fold the flap down in front and back.

106



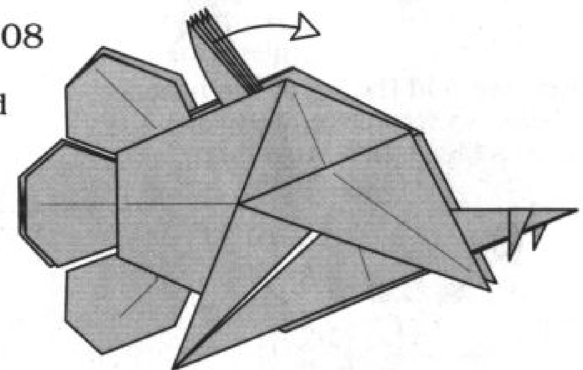
Crimp the thick bundle of points upward toward the tail.

107



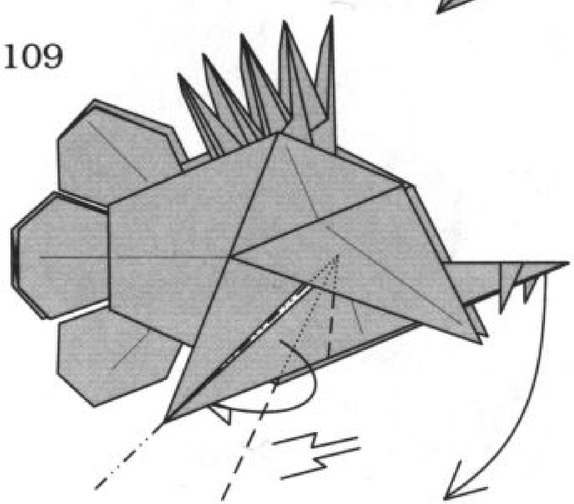
Carefully (because of the thickness) fold the entire bundle of points in half.

108



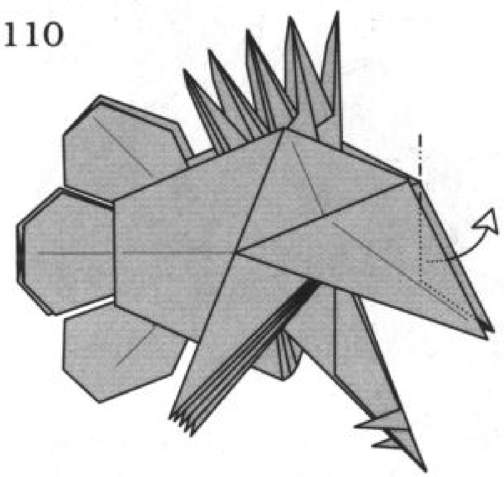
Gently spread the points apart and press the sides so that they hold their shape.

109



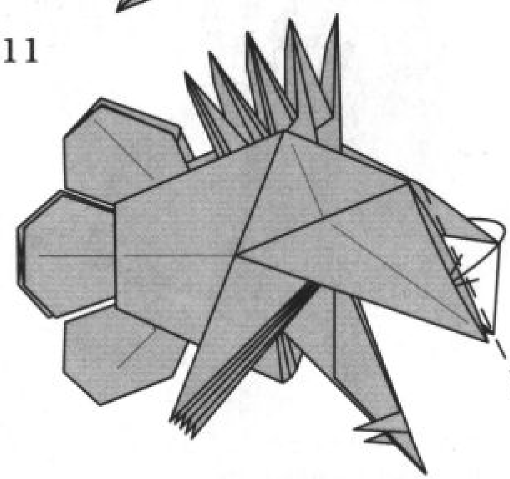
Crimp the left point downward.

110



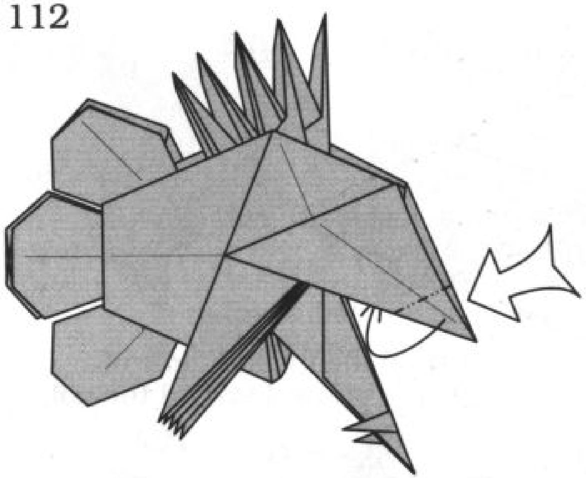
Pull some loose paper out of the far flap.

111



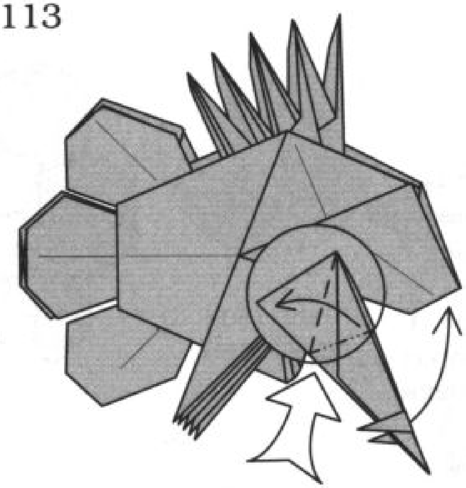
Tuck the far flap into the pocket on the near one.

112



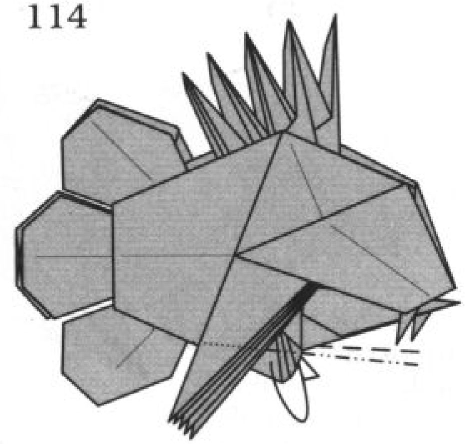
Reverse-fold the tip of the nose inside, which locks the two halves of the head together.

113



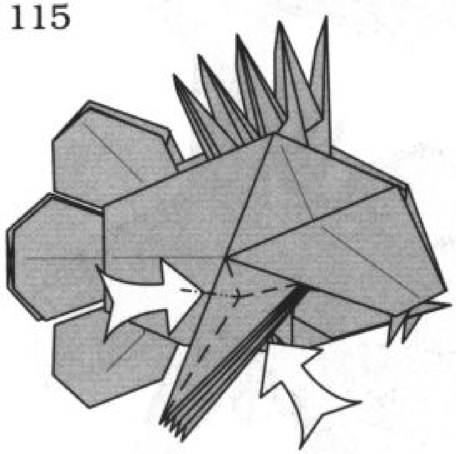
Crimp the lower jaw upward.

114



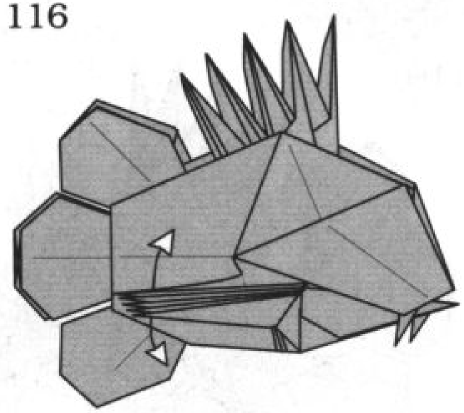
Mountain-fold the thick corners at the belly to the inside of the model (this locks the jaw crimp into place).

115



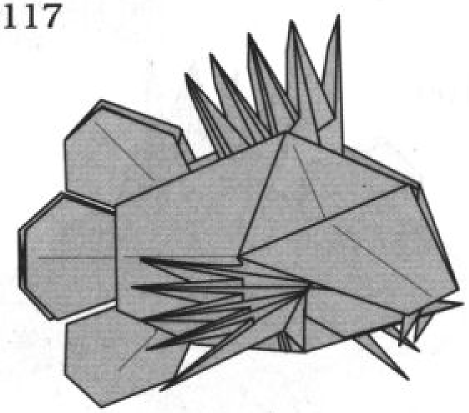
Pinch the pectoral fins in half, forming a rabbit ear through all layers.

116



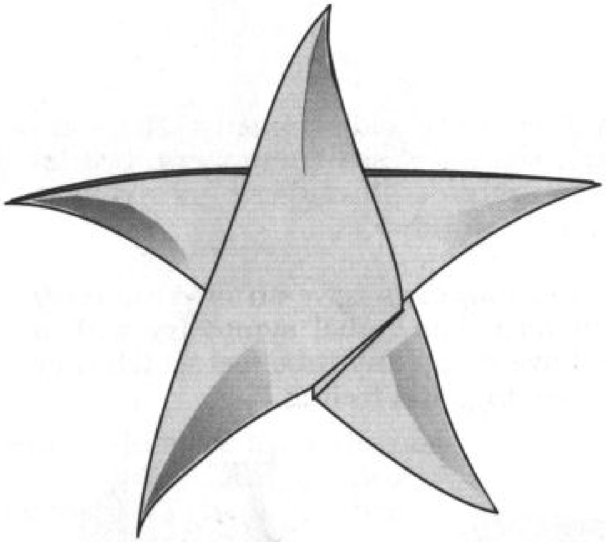
Spread the layers of the pectoral fins apart and pinch them at their base so they stand out away from the body.

117



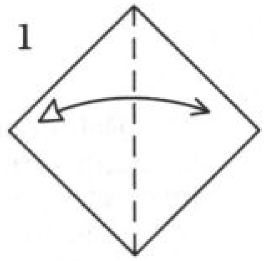
Lionfish

Starfish



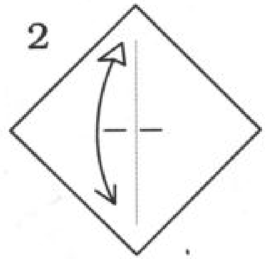
These echinoderms usually have five arms. A newly hatched starfish swims around, settling after awhile to the bottom of the sea. It crawls around the sea floor using its tube feet. The mouth is on the underside of its body and the starfish turns its stomach inside out through the mouth to eat its prey. It feeds on oysters, clams, sponges, and other small animals. When cut, the starfish (*Asterias forbesi*) can grow new arms.

1



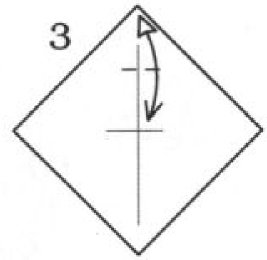
Fold and unfold.

2



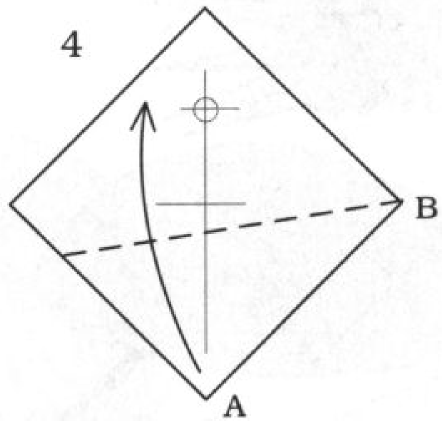
Make a small crease.

3



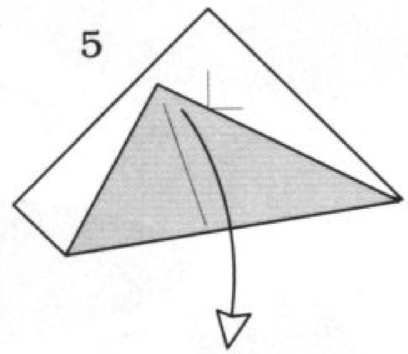
Fold the top corner to the center and unfold. Make a small crease.

4



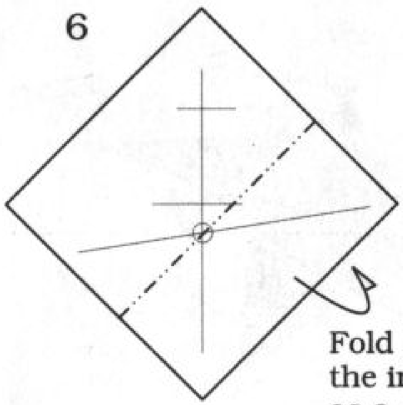
Fold up so that some point on line A–B meets the intersection in the circle.

5



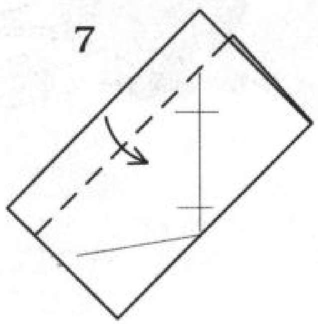
Unfold.

6

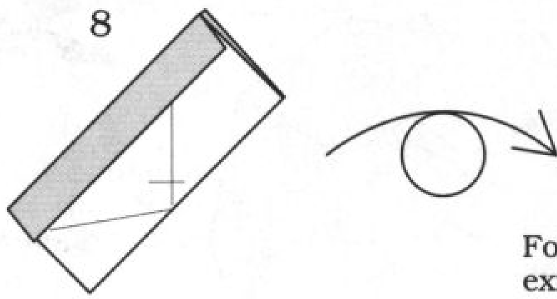


Fold behind using the intersection as a guide.

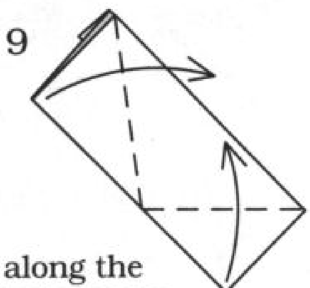
7



8

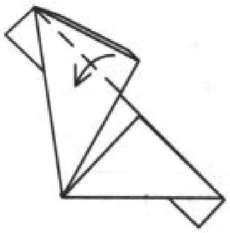


9

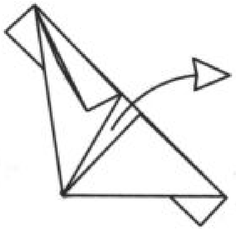


Fold along the existing creases.

10

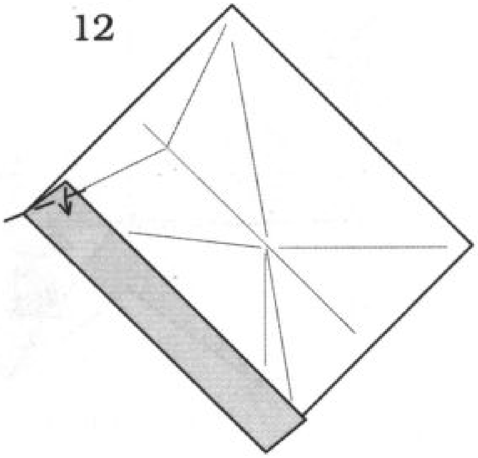


11

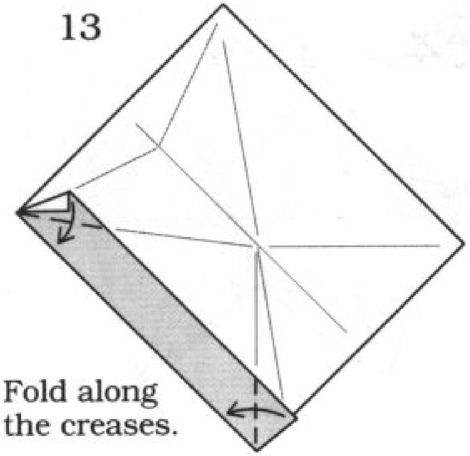


Unfold almost everything.

12

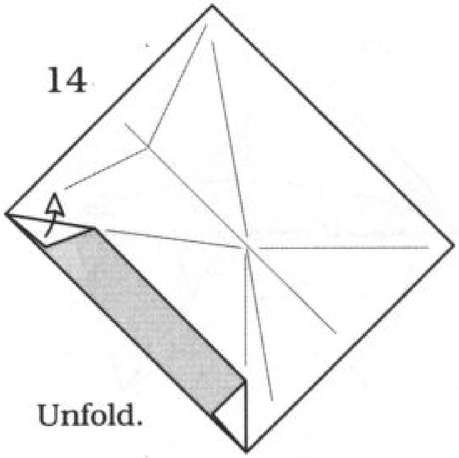


13



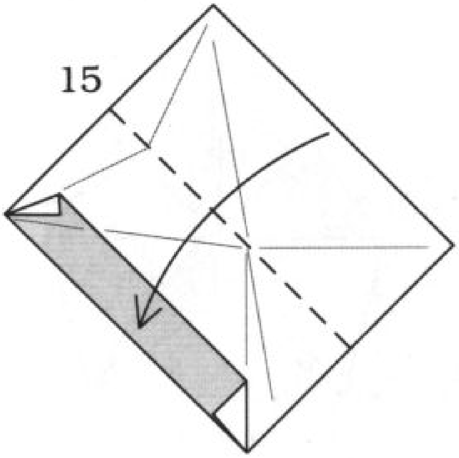
Fold along the creases.

14

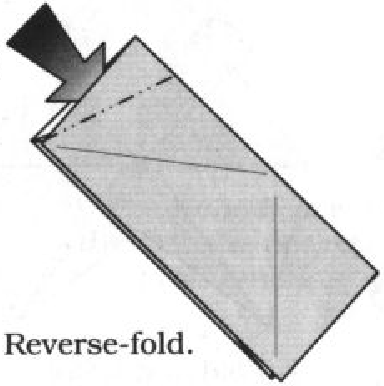


Unfold.

15

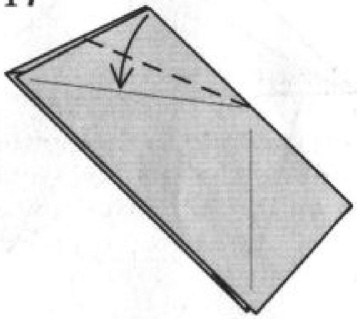


16

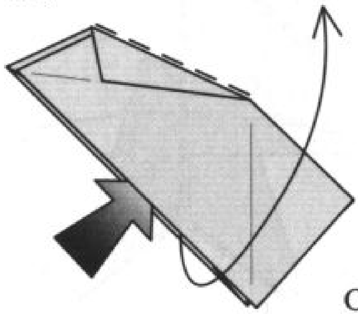


Reverse-fold.

17

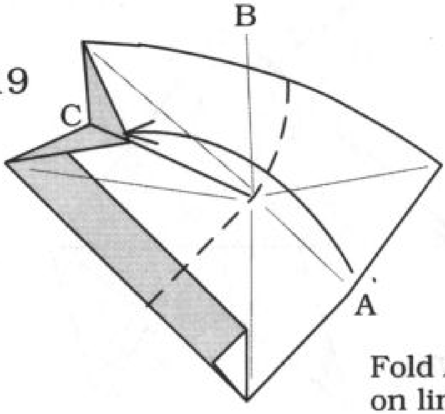


18



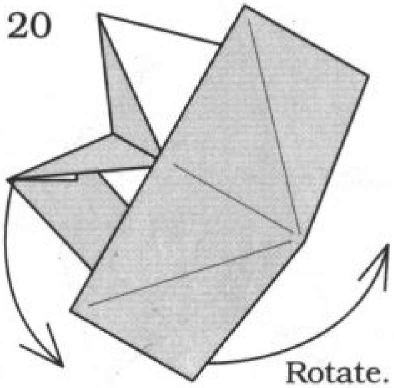
Open.

19



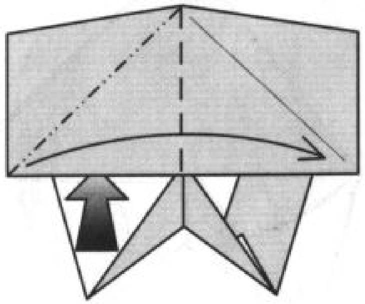
Fold A to lie on line B–C.

20



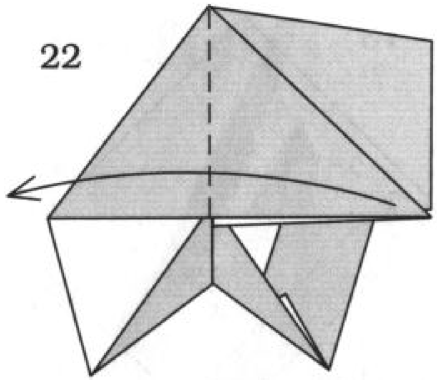
Rotate.

21

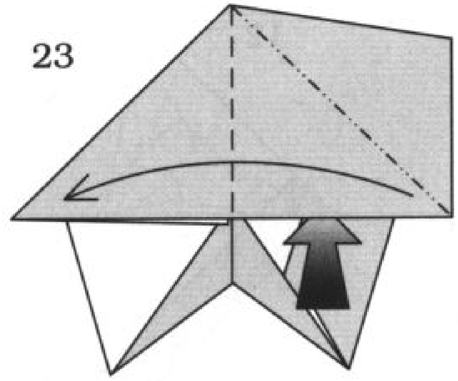


Squash-fold.

22

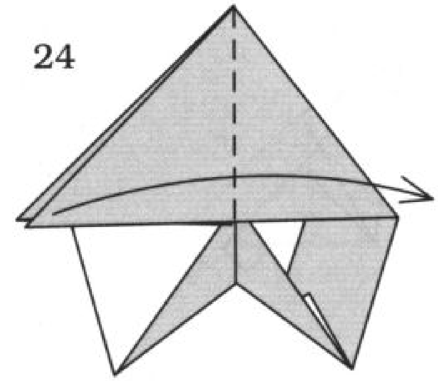


23

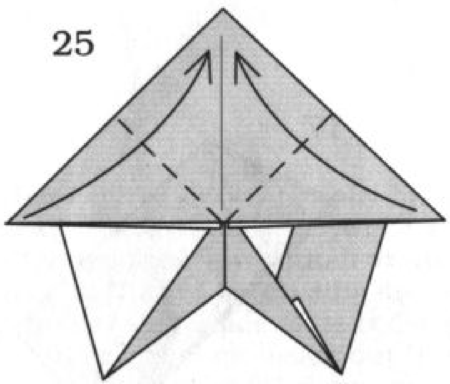


Squash-fold.

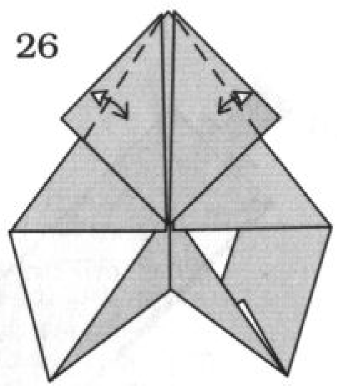
24



25

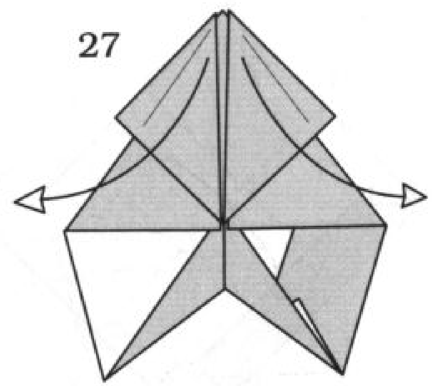


26



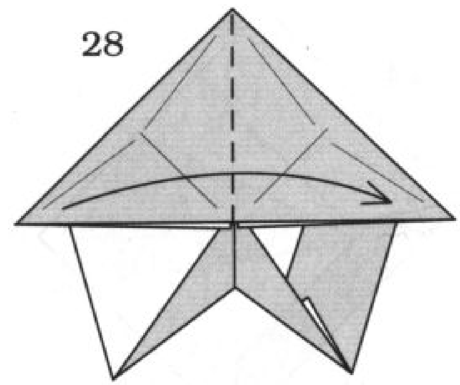
Fold and unfold.

27

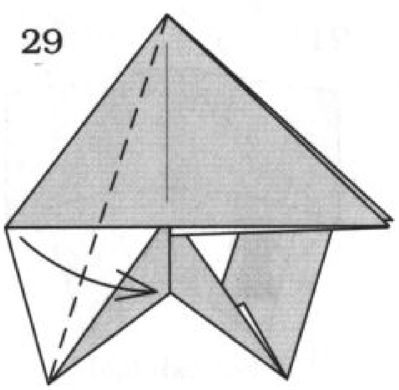


Unfold.

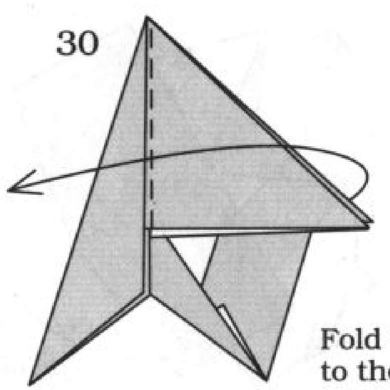
28



29

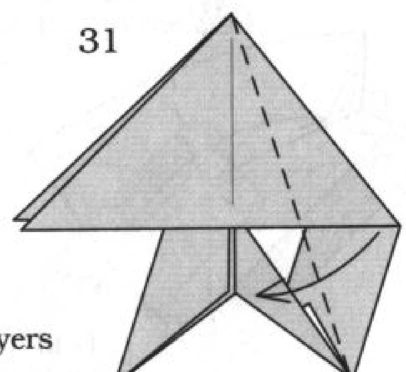


30

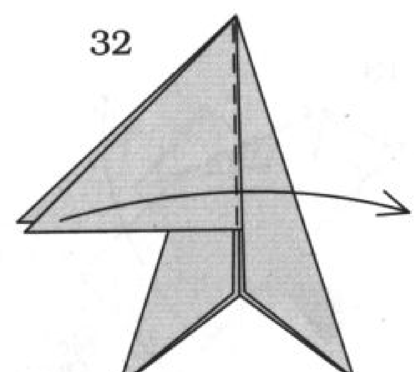


Fold two layers
to the left.

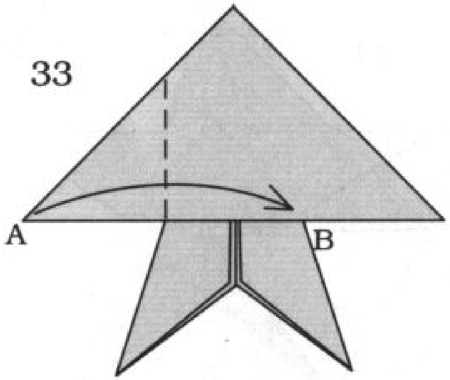
31



32

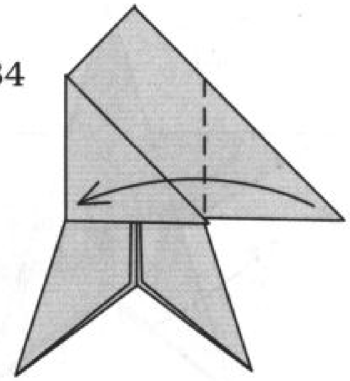


33

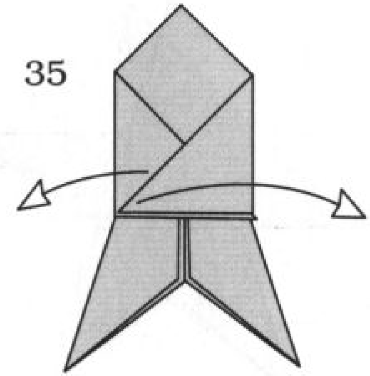


Fold A to B.

34

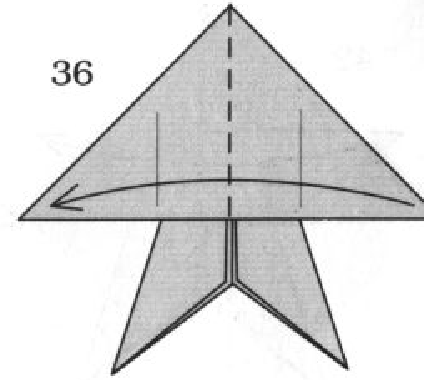


35

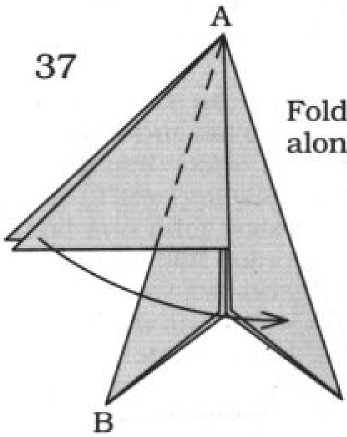


Unfold.

36

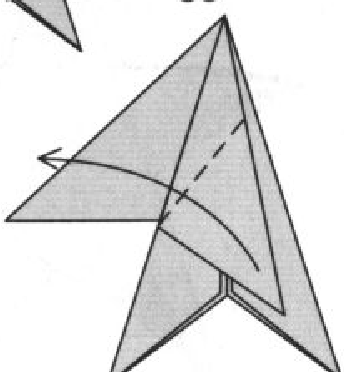


37



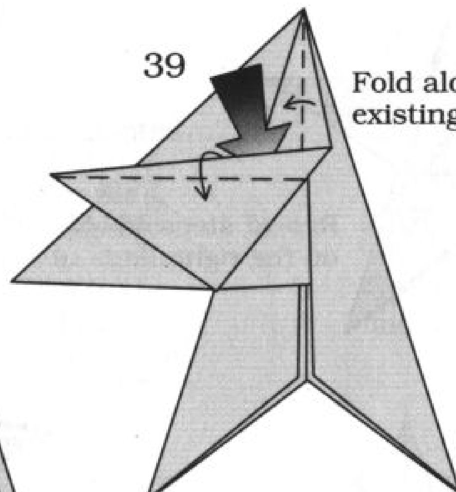
Fold down along line A–B.

38



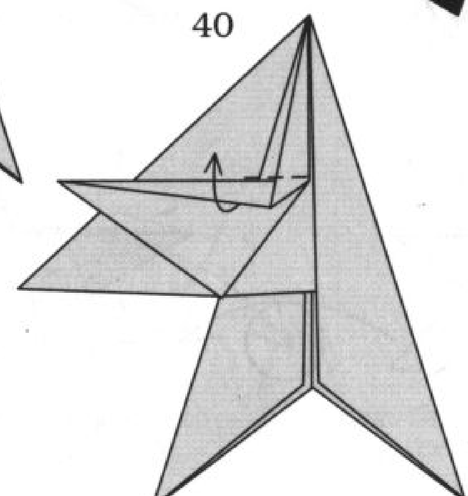
Fold along the existing crease.

39

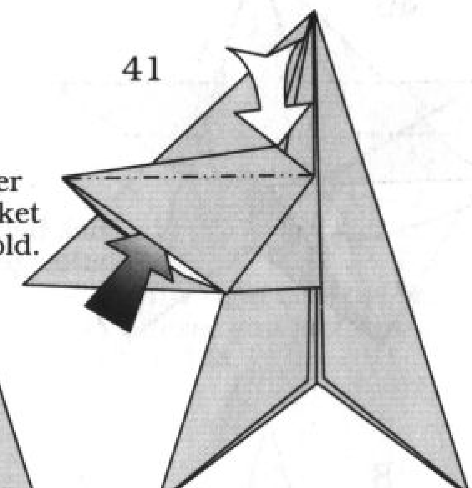


Fold along the existing crease.

40

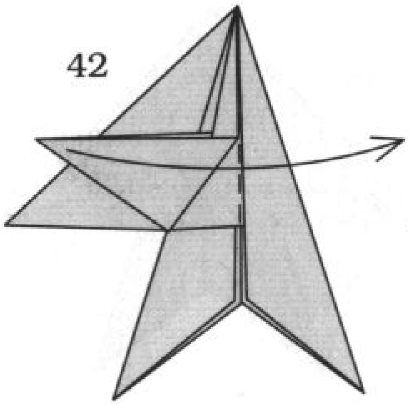


41

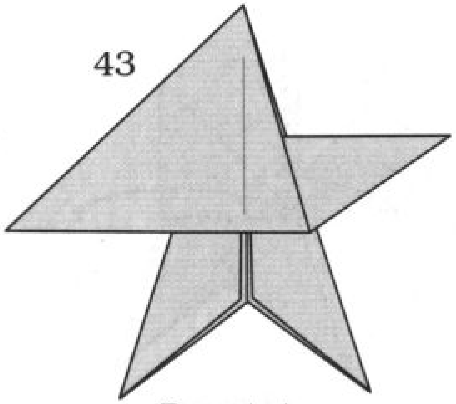


Place one finger inside the pocket for this sink fold.

42

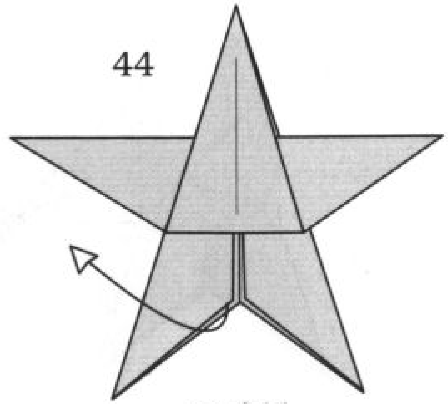


43



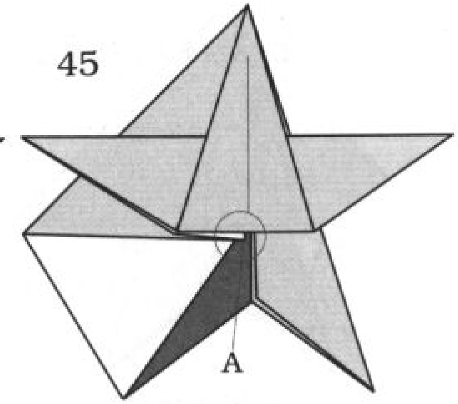
Repeat steps 36–42 on the left.

44



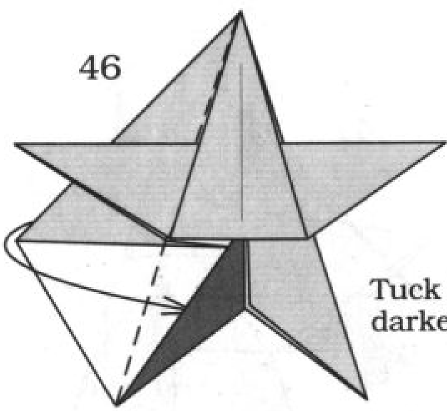
Unfold.

45



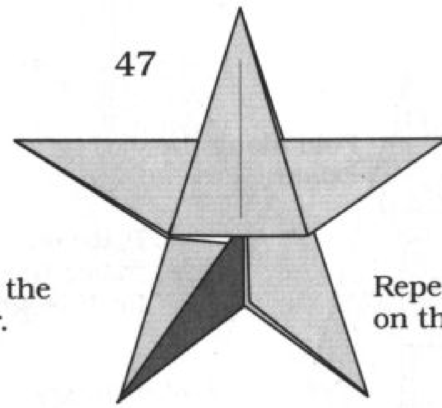
Tuck the tiny corner A under the darker paper.

46



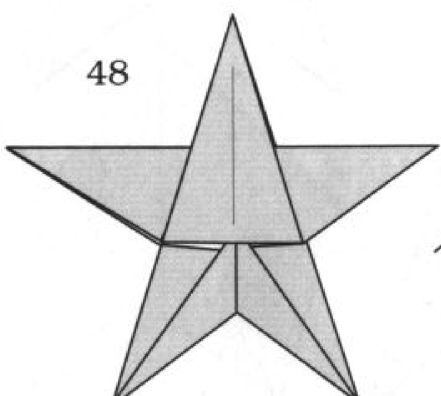
Tuck behind the darker paper.

47

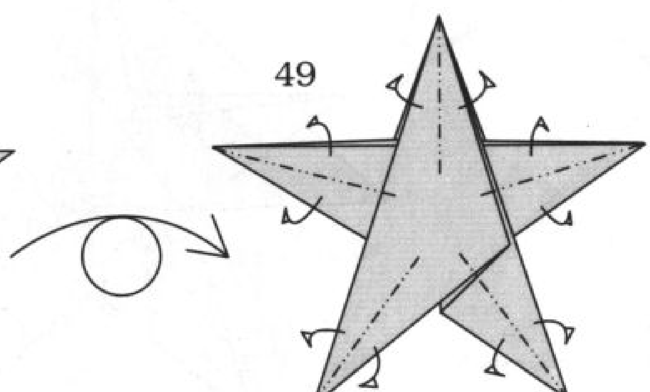


Repeat steps 44–46 on the right.

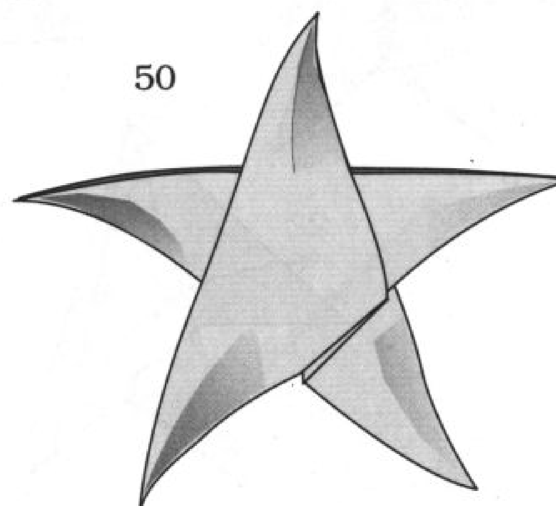
48



49

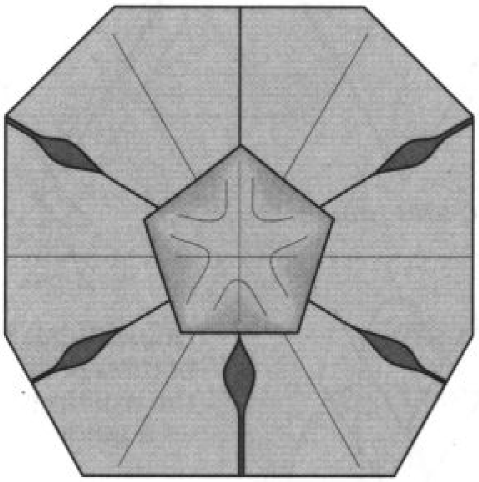


50



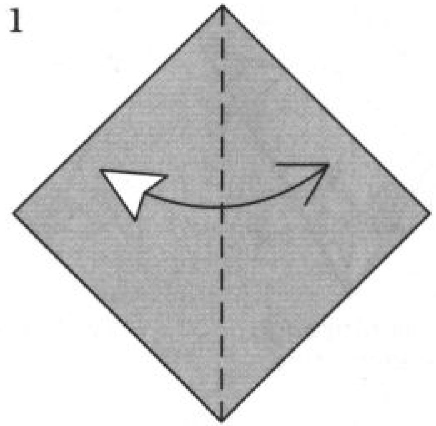
Starfish

Sand Dollar



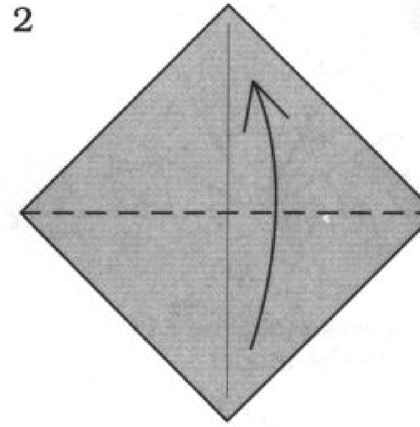
Sand dollars are of the same class as sea urchins, but have shed their spines and adopted a flattened shape suitable for burrowing into sand. They typically stand up vertically in the sand and filter water for plankton. The Keyhole Urchin (*Millita quinquiespertorata*) lives in shallow water below low-tide lines from Cape Cod to the Caribbean and along coastal Mexico and Brazil. Its five slots begin as notches when the animal is young, but close off as it matures.

1



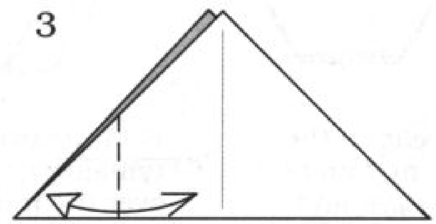
Crease the vertical diagonal.

2



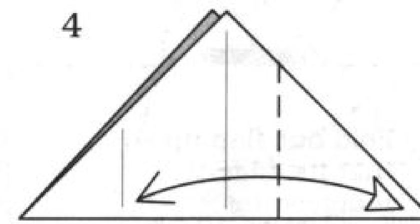
Fold the bottom corner up to the top.

3



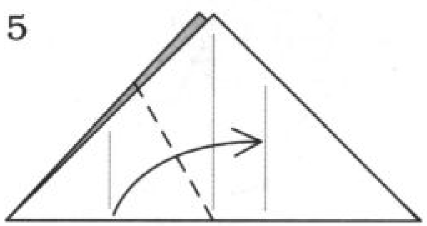
Fold the left corner in to the middle and unfold.

4



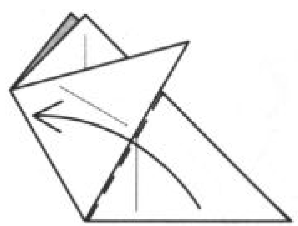
Fold the right corner over to the crease you just made and unfold.

5



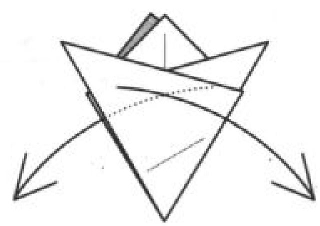
Fold the left corner up so that the crease made in step 3 touches the crease made in step 4.

6



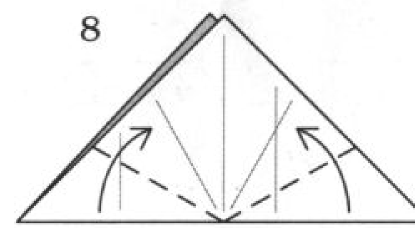
Fold the right corner up to cover the left one.

7



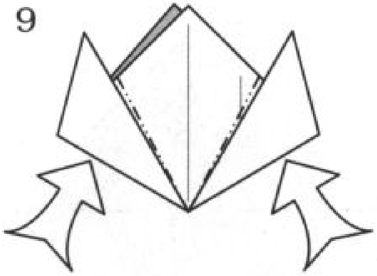
Unfold to step 3.

8



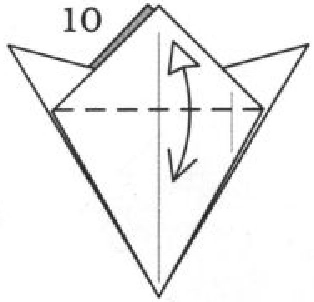
Fold the two bottom corners up so that their edges lie along the creases made in steps 5 and 6.

9



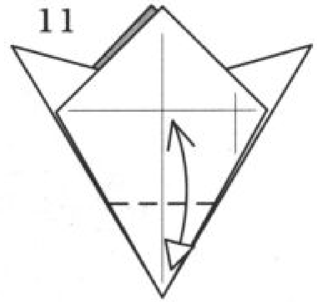
Reverse-fold the edges into the model.

10



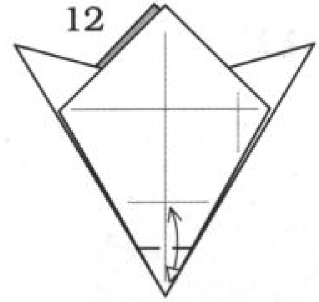
Crease through one layer only.

11



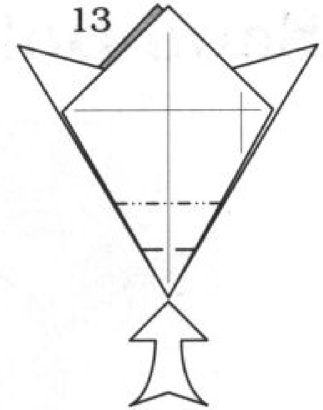
Fold and unfold.

12



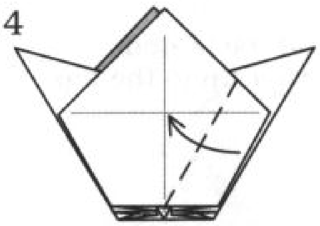
Fold and unfold.

13



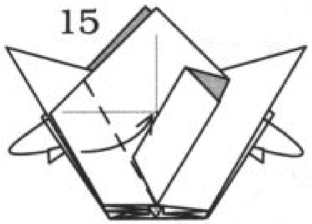
Double-sink the bottom point, using the existing creases as a guide.

14



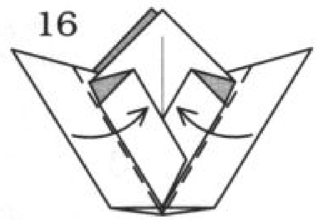
Fold one flap up so that its edge touches the intersection shown.

15



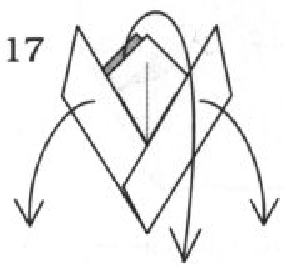
Repeat on the left, and on both the right and left in back.

16



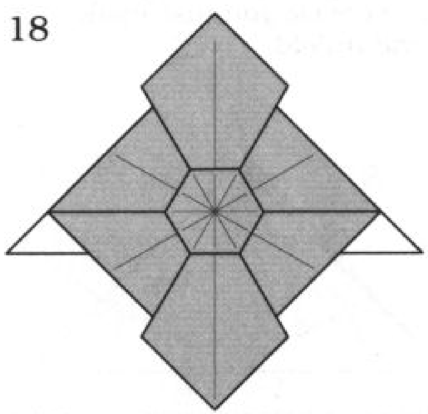
Fold the two remaining flaps over the front flaps.

17

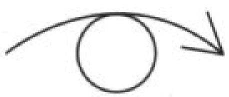


Fold one of the points at the top downward and open the model out flat.

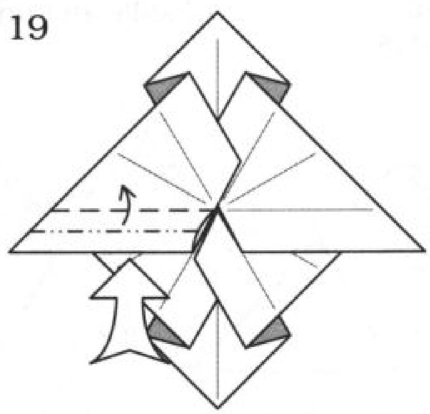
18



It looks like this. Turn the paper over.

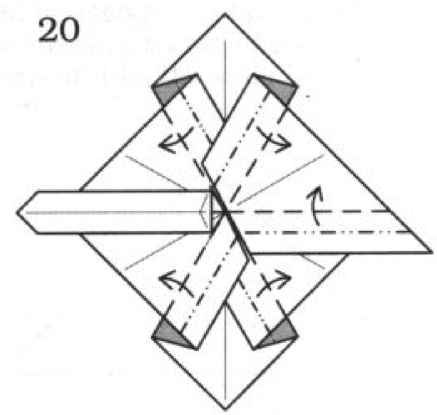


19



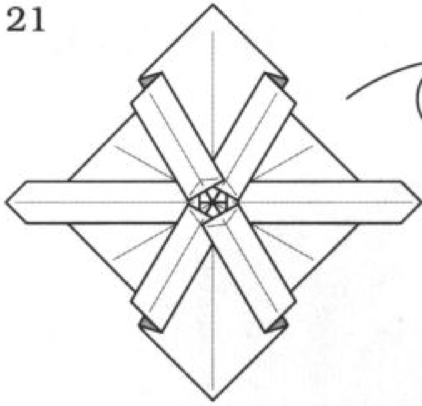
Symmetrically spread-squash the flap shown.

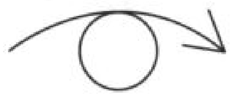
20



Repeat on the other five similar flaps.

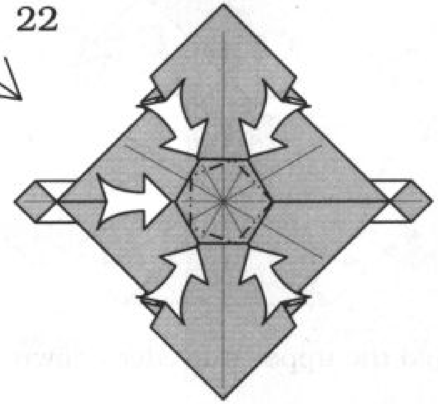
21





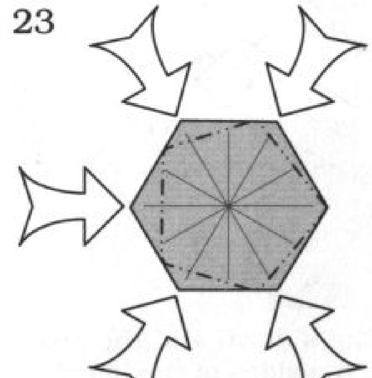
Like this. Turn the paper over.

22



Carefully sink five corners of the central hexagon. Note that each sink is asymmetric, so that the result is a pentagon. Also note that the point of the pentagon goes toward the side, rather than the top.

23



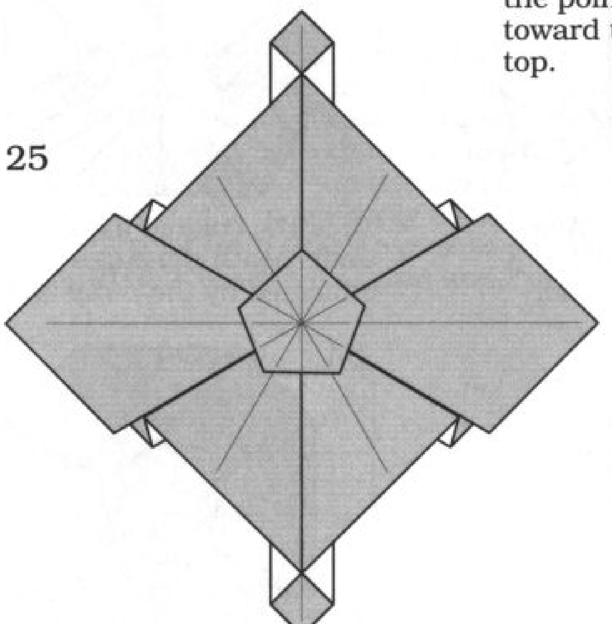
Close-up view of the sinks.

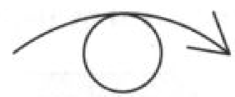
24



Rotate the model 1/4 turn counterclockwise.

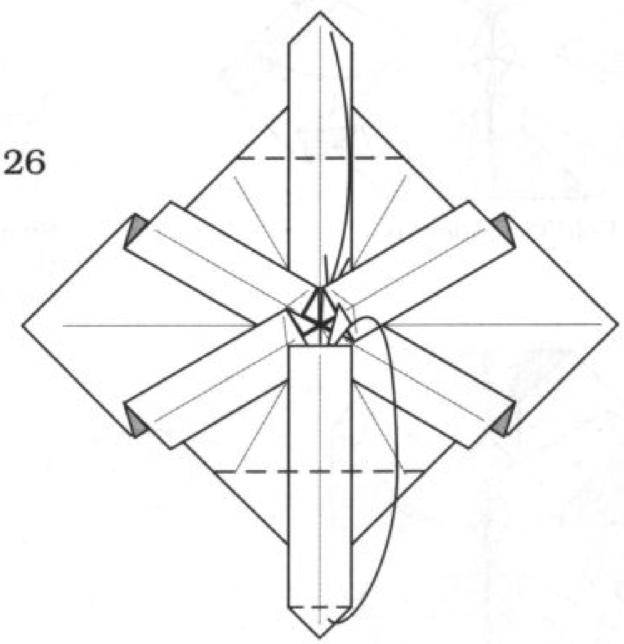
25





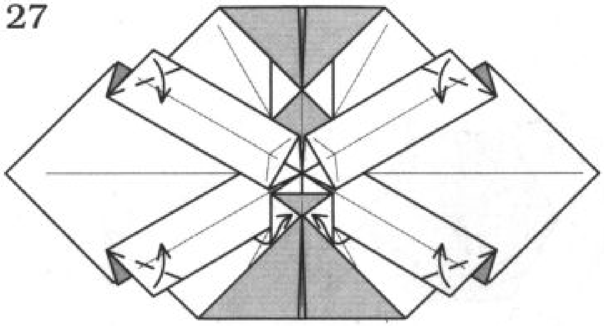
Like this. The long axis of the model is vertical and the point of the pentagon should point upward. Turn the paper over from side to side.

26



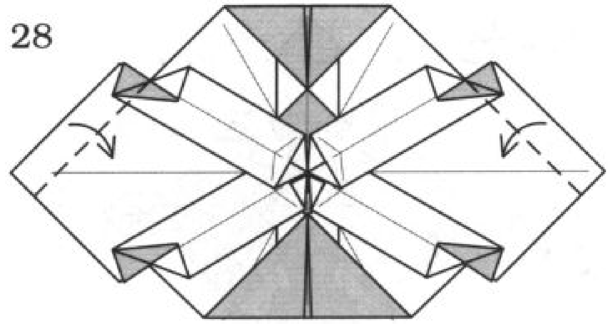
Fold the top point down and tuck its tip under the two overlapping spread-squashed flaps. Fold slightly more of the bottom point up and fold its tip over and tuck it into the pocket formed by the spread-squashed flap.

27



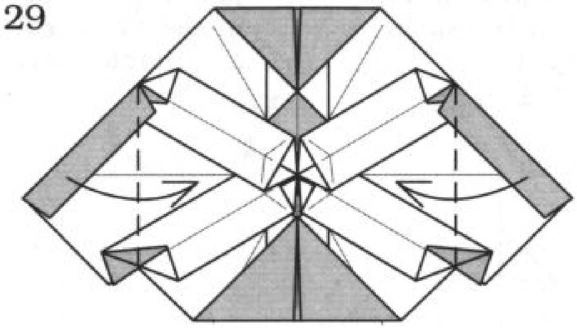
Fold the two upper corners down and the two lower corners up; tuck the sides of the lower central flap under the flaps to either side.

28



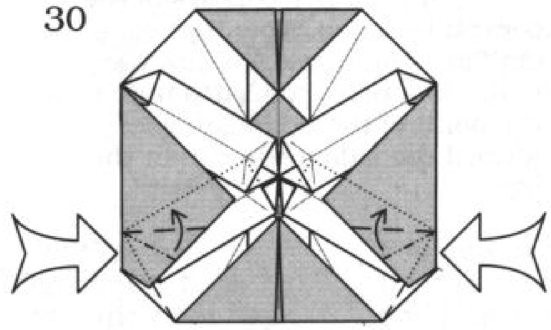
Fold the upper side edges down.

29



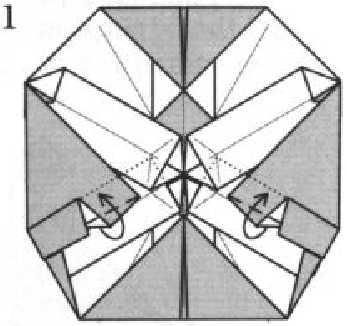
Fold the sides in.

30



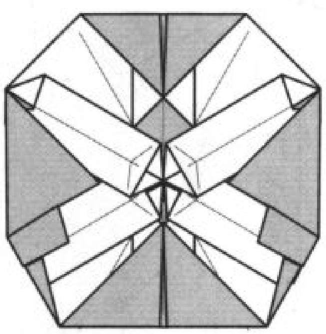
Swivel-fold the sides upward so that the mountain fold is aligned with the edge indicated by the x-ray line.

31

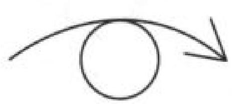


Tuck the colored flaps underneath the edges indicated by the x-ray line.

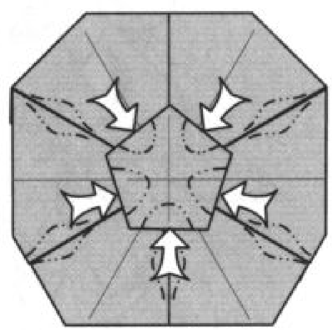
32



Like this. Turn the paper over from side to side.

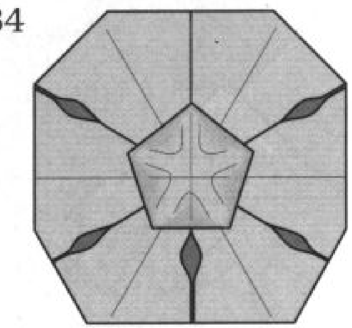


33



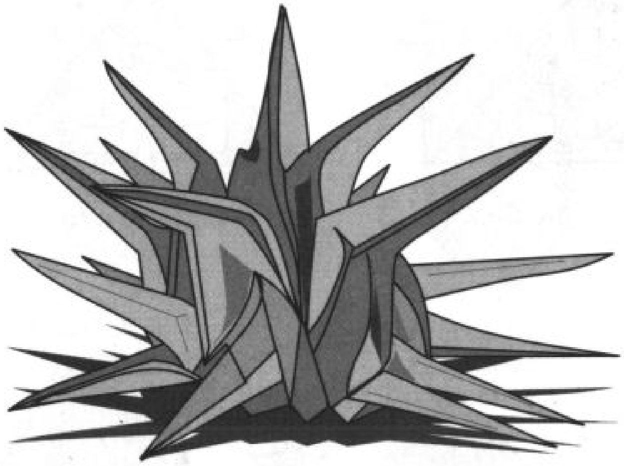
Shape the sides of the central pentagon with mountain folds. Mountain-fold the edges radiating out from the center to create the appearance of holes.

34

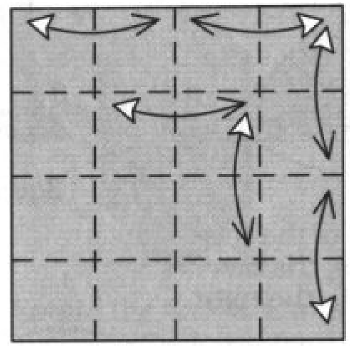


Sand Dollar

Atlantic Purple Sea Urchin

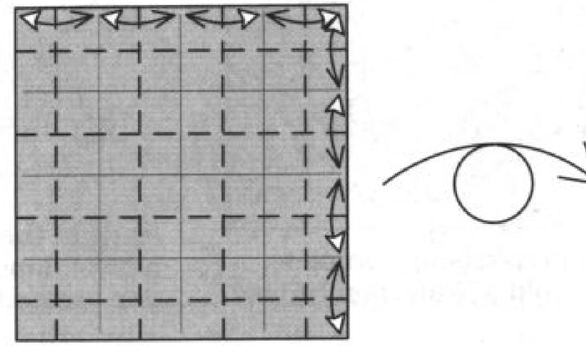


1



Crease the paper into fourths vertically and horizontally.

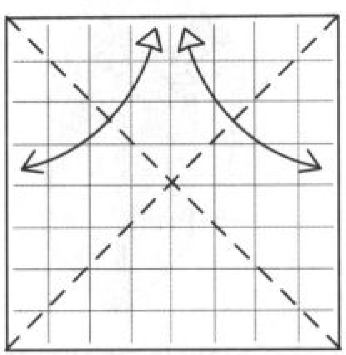
2



Crease it into eighths vertically and horizontally. Turn the paper over.

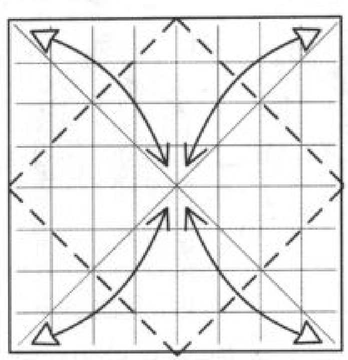
The Atlantic Purple Sea Urchin (*Arbacia punctulata*) lives on rocky coasts and shell bottoms from the low-tide line to waters 200 meters deep, and is responsible for much erosion of softer rocks and the production of sand. It has five very strong teeth in its mouth, which is located on the underside of the body. These teeth are used to rasp algae off rock surfaces and, if the rock is soft, some of it comes away as well. There are many species worldwide that range in color from delicate pink to powder blue; all are edible and are considered delicacies in Japan and France.

3



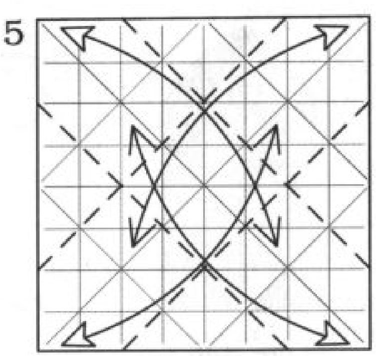
Crease the diagonals.

4



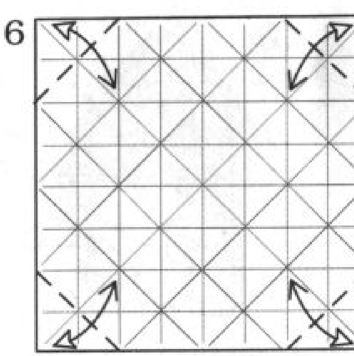
Bring the corners to the center, crease, and unfold.

5



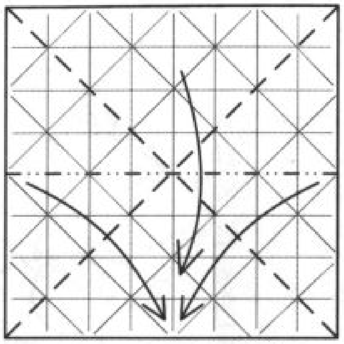
Add more diagonal creases.

6



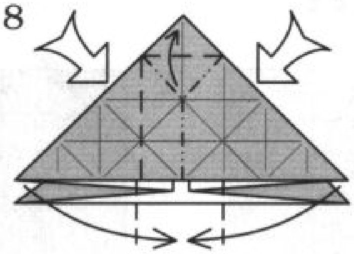
And more.

7



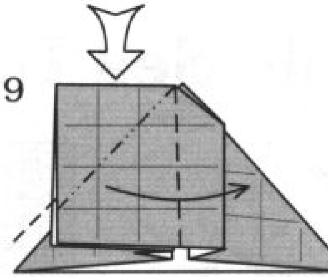
Precreasing complete.
Fold a Waterbomb Base.

8



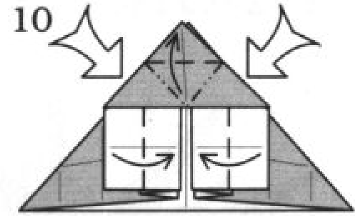
Push in the sides of the top pair of flaps; swing the new flap created over to the right.

9



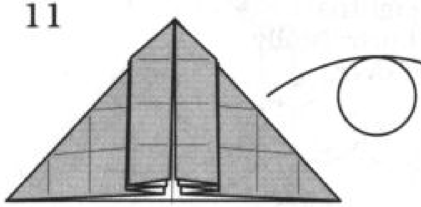
Squash-fold the flap.

10



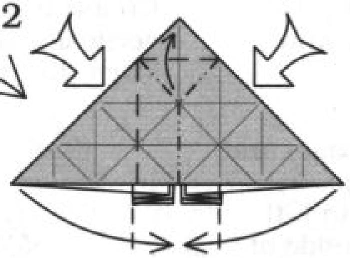
Petal-fold the edge.

11



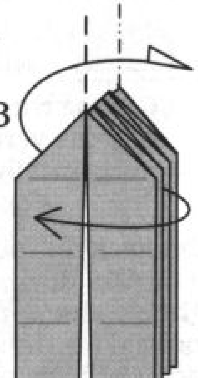
Like this. Turn the paper over.

12



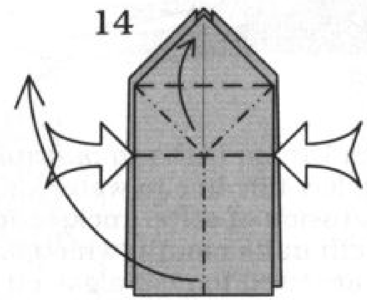
Repeat steps 8–10 on this side.

13



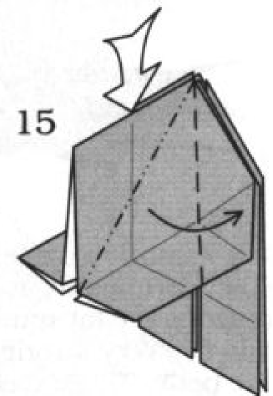
Fold two layers to the left in front and two to the right in back.

14



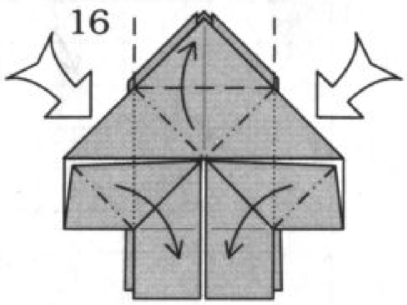
Push in the sides of the near layer of paper, so that the edge stands out away from the rest of the model.

15



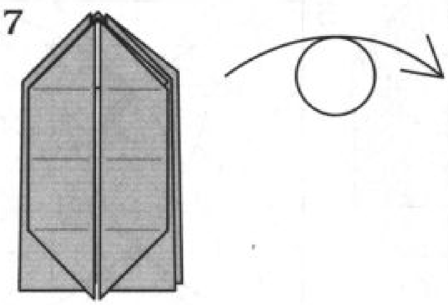
Squash-fold the edge.

16



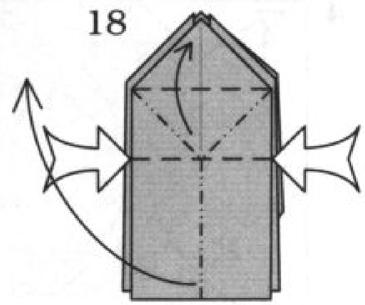
Petal-fold the edge in the middle of the model and swing the side corners down.

17



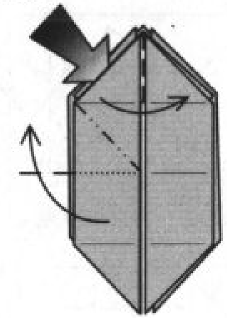
Like this.
Turn the paper over.

18



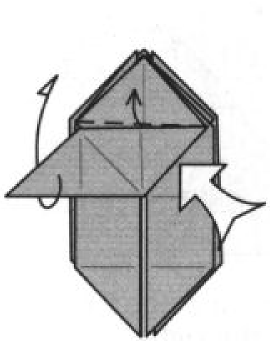
Repeat steps 14–16 on this side.

19



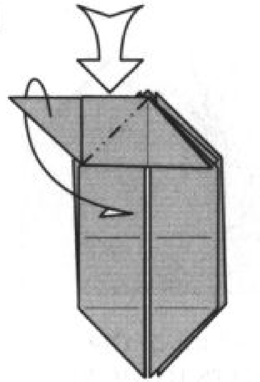
Fold one layer over to the right and swing the bottom left flap upward.

20



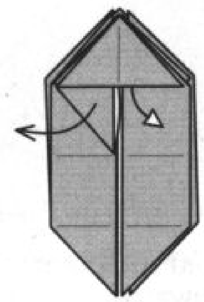
Closed-sink the corner upward.

21



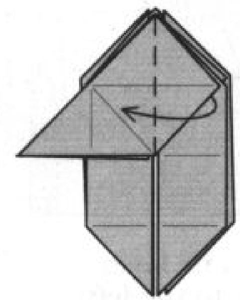
Reverse-fold the edge shown downward.

22



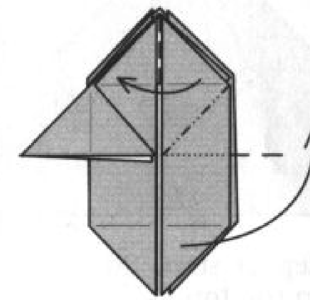
Rotate the flap clockwise and pull the loose paper out of the pocket.

23



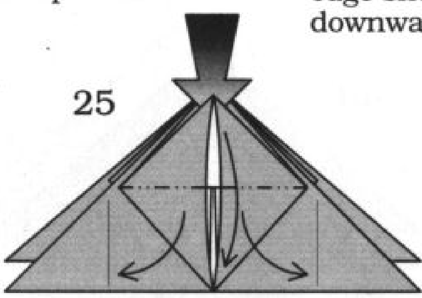
Fold one corner to the left.

24



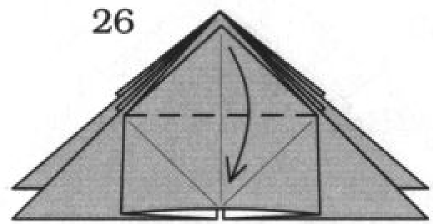
Repeat steps 19–23 on the right and on the other side.

25



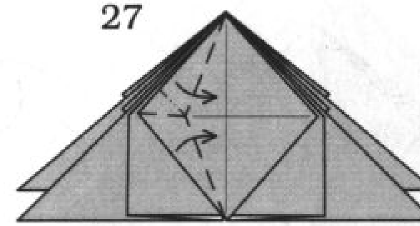
Squash-fold the point downward.

26



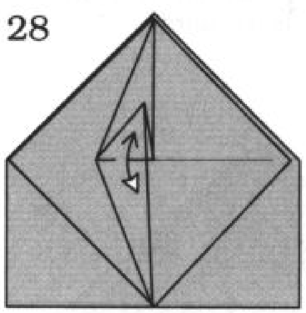
Fold down one more point.

27



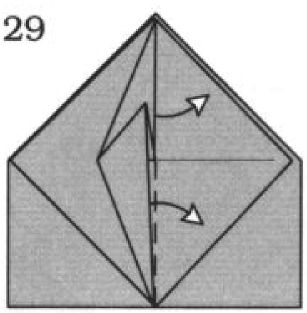
Fold a rabbit ear.

28



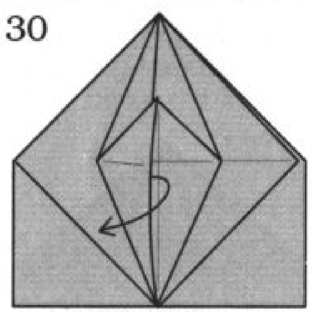
Fold the tip of the rabbit ear back and forth several times.

29



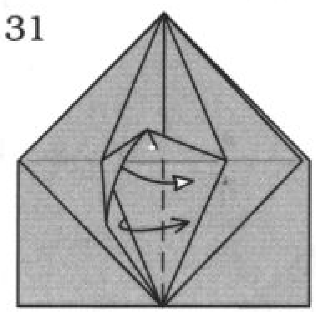
Pull a single layer of paper out from inside the rabbit ear. This is difficult because there are no loose edges to grab, but if you can get it started at the bottom corner, you can work your way up.

30



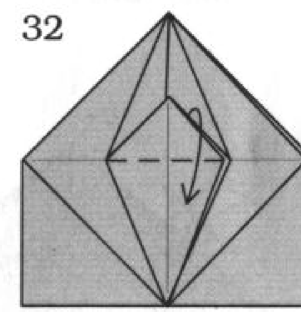
Open out the pocket slightly.

31



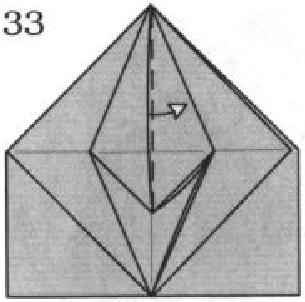
Pull the folded edge out from inside the pocket, turning a layer inside-out as you go.

32



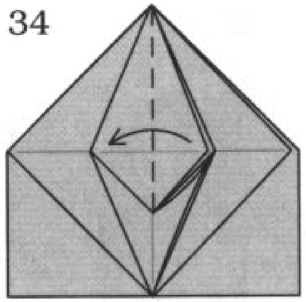
Fold the point down.

33



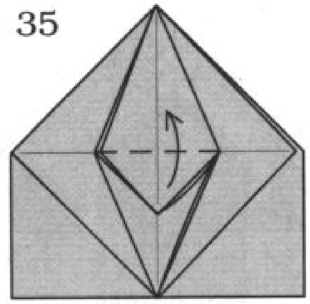
Repeat steps 30–31 on the top.

34



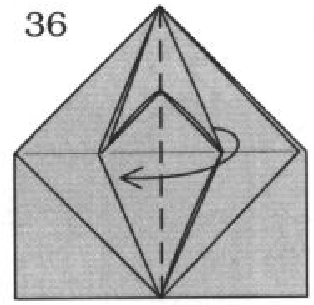
Fold one layer back to the left.

35



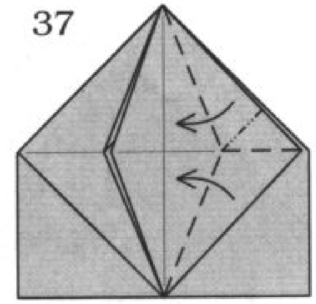
Fold the point upward.

36



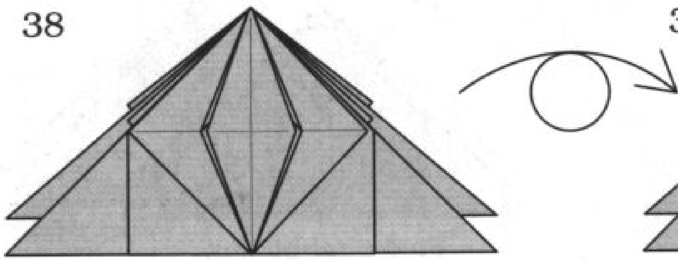
Fold all of the layers to the left.

37



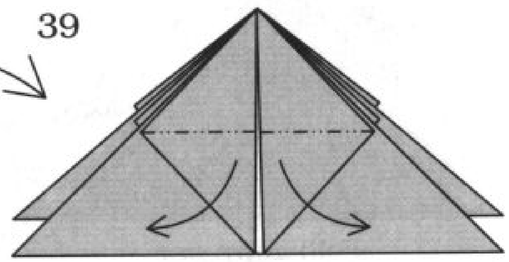
Repeat steps 27–36 on the right.

38



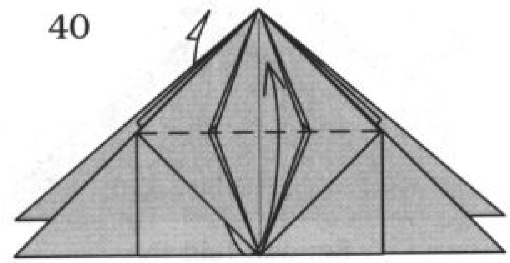
Like this. Turn the model over.

39



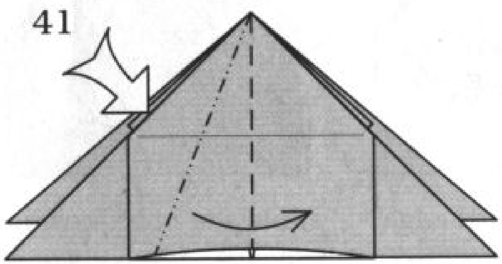
Repeat steps 25–37 on this side.

40



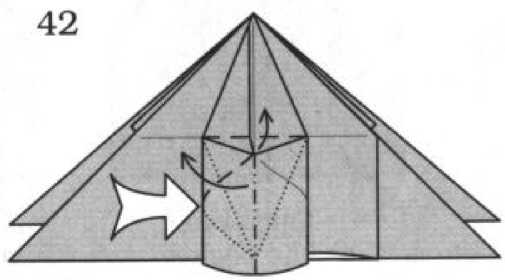
Fold one point up in front and one up in back.

41



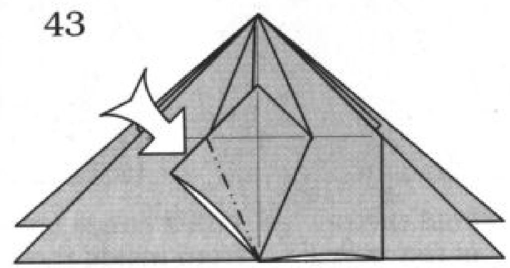
Squash-fold the indicated edge, but flatten only its upper half.

42



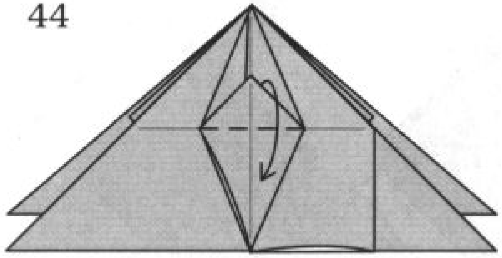
Pinch the sides of the lower part of the squash and swing the resulting flap to the left.

43



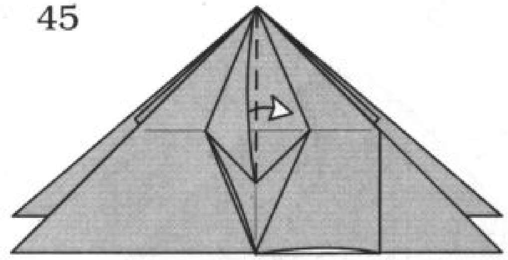
Reverse-fold the edge.

44



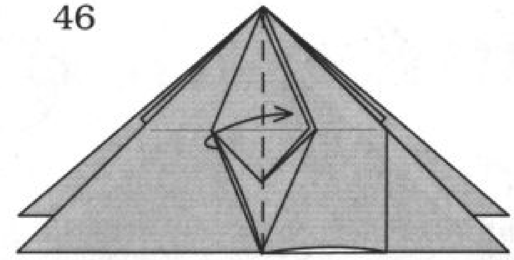
Fold the point down.

45



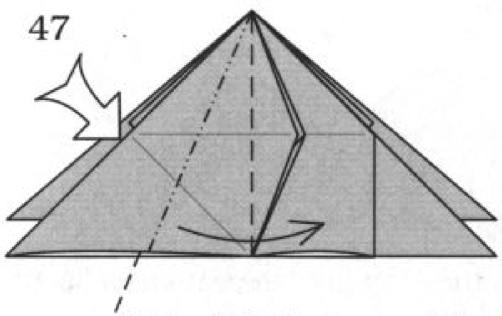
Pull the folded edge out of the pocket as in steps 30–31.

46



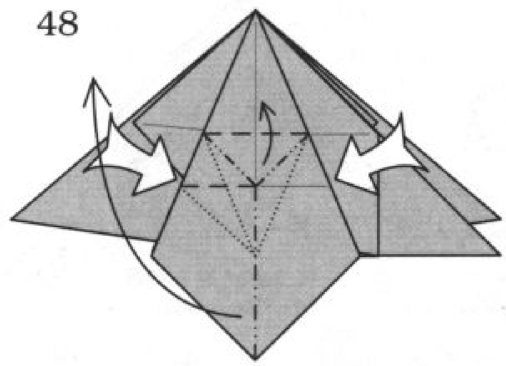
Fold all layers to the right.

47



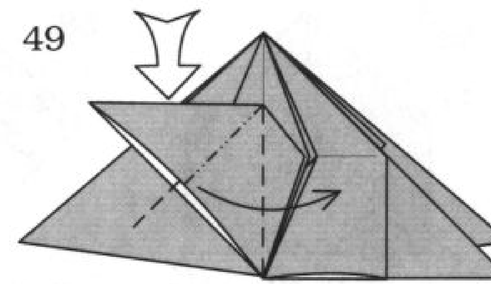
Squash-fold.

48



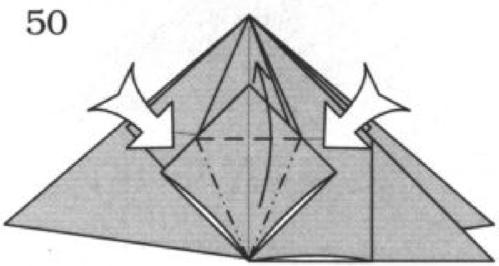
Pinch the lower edges of the squash fold together and swing the flap up to the left.

49



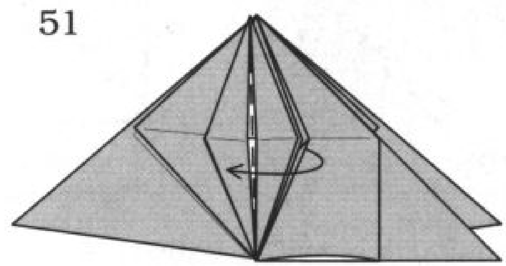
Squash-fold the new flap.

50



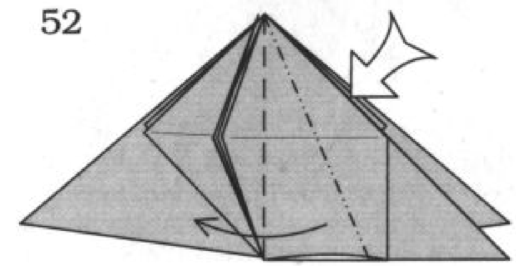
Petal-fold.

51



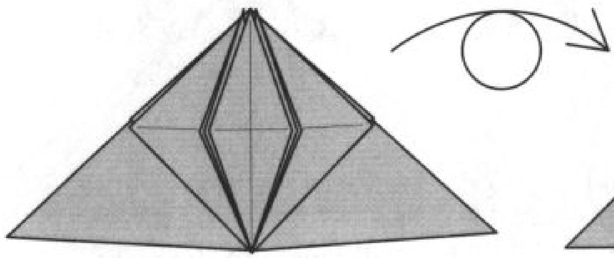
Fold all layers to the left.

52



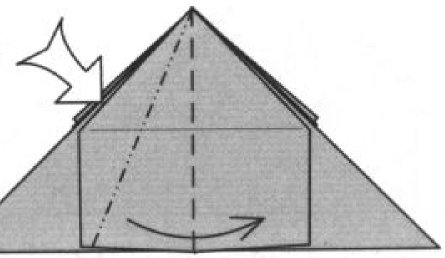
Repeat steps 41–51 on the right.

53



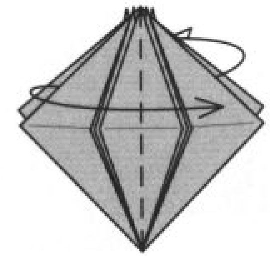
Turn the paper over.

54



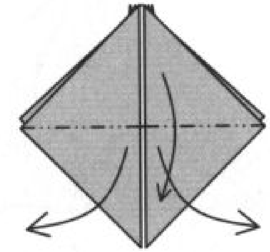
Repeat steps 41–52.

55



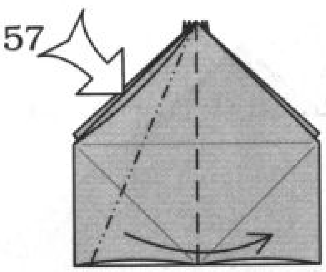
Rotate layers in front and back.

56



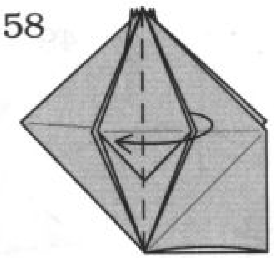
Squash-fold the point downward.

57



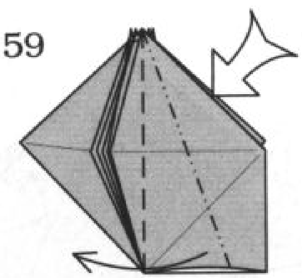
Repeat steps 41–45.

58



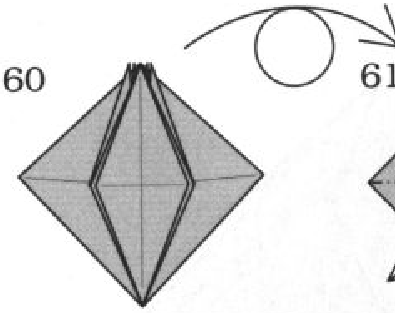
Fold the layers back to the left.

59



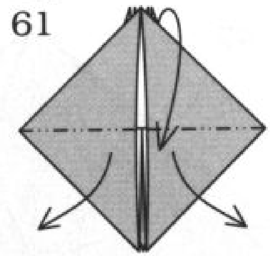
Repeat 41–46 on the right.

60



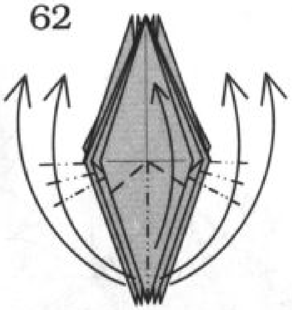
Turn the model over.

61



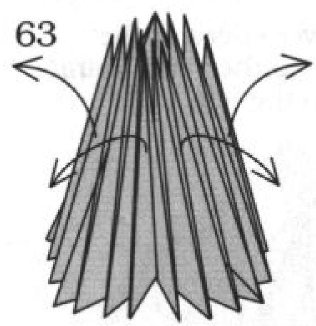
Repeat steps 55–60.

62



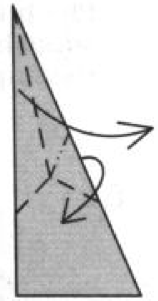
Reverse-fold all 12 points at the bottom upward. The model is very thick, and you should not try to flatten it out. Rather, fan the layers in all directions so that the model becomes conical and three-dimensional.

63



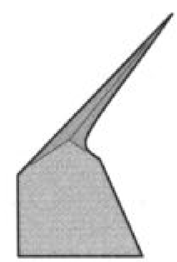
Rabbit-ear each of the 25 points outward and adjust them to point in all directions.

64



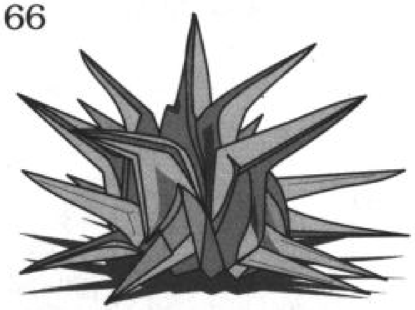
Detail of a single point. Fold a rabbit ear.

65



Like this.

66



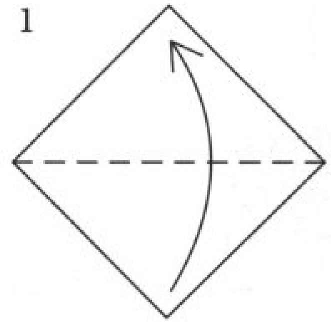
Atlantic Purple Sea Urchin

Bay Barnacle



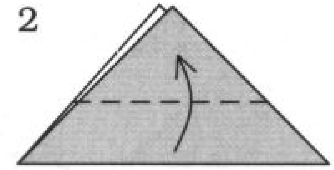
The Bay Barnacle (*Balanus improvisus*) is commonly found attached in great masses to rocks, pilings, oysters, and other hard-shelled animals. Unlike most barnacles, it tolerates fresh water at least occasionally, and is commonly found in bays and brackish estuaries. Barnacles are filter feeders, using their feathery legs to comb the water for plankton and other small organisms.

1



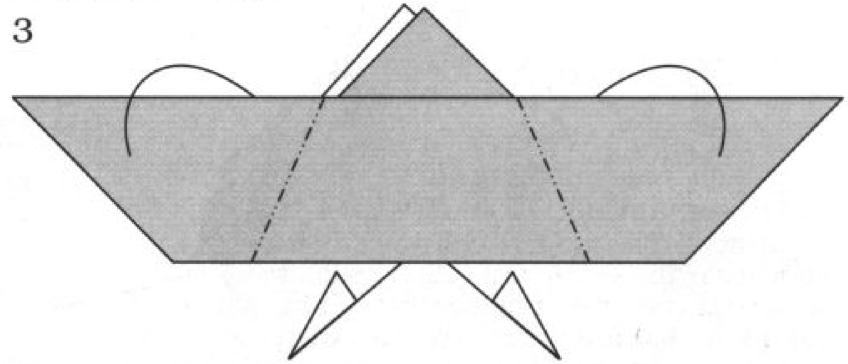
Fold the bottom corner up to the top.

2



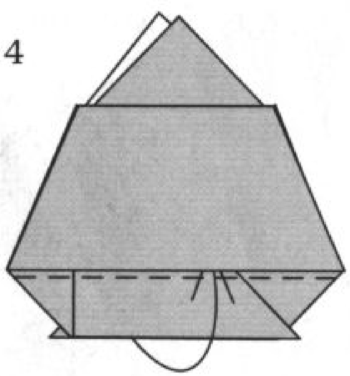
Fold the bottom edge up almost to the top corner (the exact amount isn't critical).

3



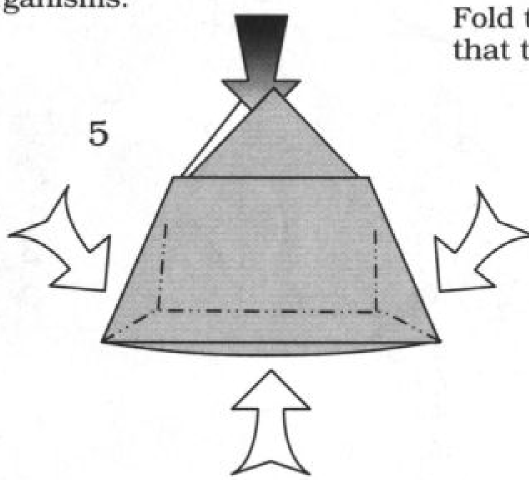
Fold the two corners down so that they cross each other.

4



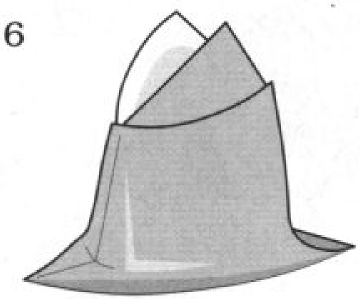
Fold all the layers together as one and tuck inside the model.

5



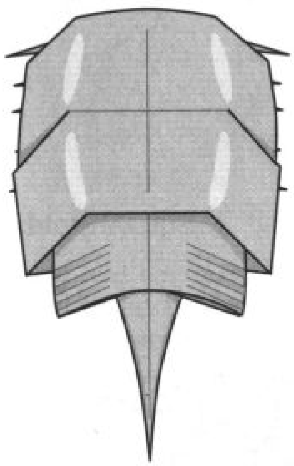
Push in the sides and bottom to make the model three-dimensional.

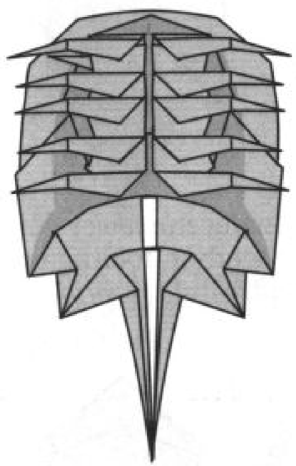
6



Bay Barnacle

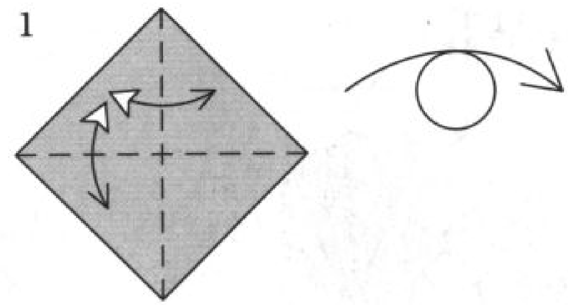
Horseshoe Crab





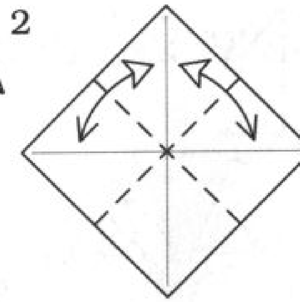
The Horseshoe Crab (*Limulus polyphemus*) is the only American example of its subclass, the *Xiphosura*. The larvae are called "trilobite larvae" because of their resemblance to trilobite fossils, and it is believed that the trilobites were the ancestors of the *Xiphosura*. Horseshoe crabs have relatively simple eyes, which has resulted in their being extensively used in neurophysiological research.

1



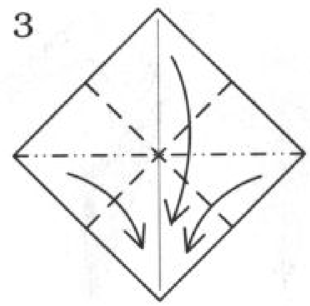
Crease the vertical and horizontal diagonals. Turn the paper over.

2



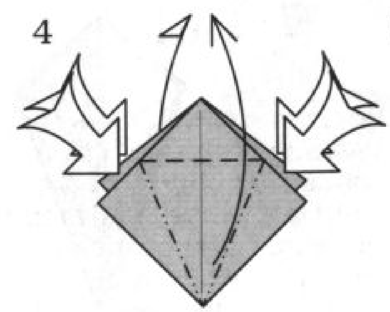
Fold the paper in half and unfold.

3



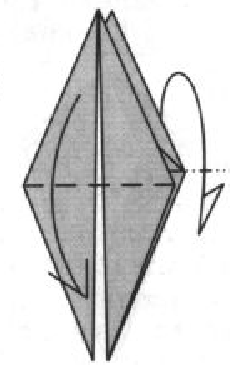
Fold a Preliminary Fold.

4



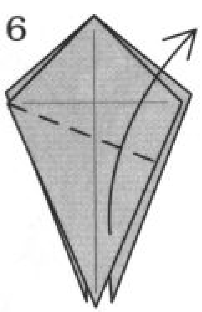
Petal-fold to make a Bird Base.

5



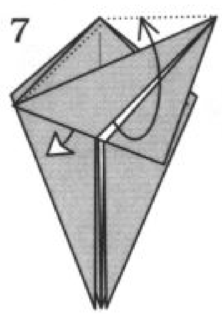
Fold the front and back flaps down.

6



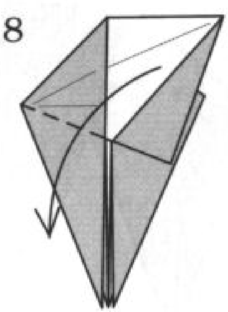
Fold the front flap up and to the right at right angles to the right edge.

7



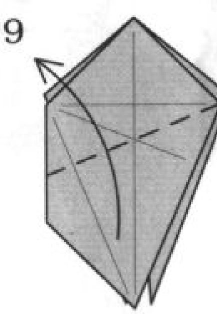
Pull the raw edge upward and release the loose paper under the flap.

8



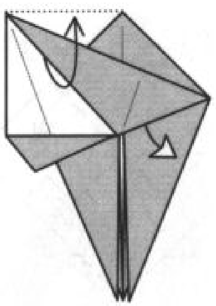
Fold the flap back down.

9



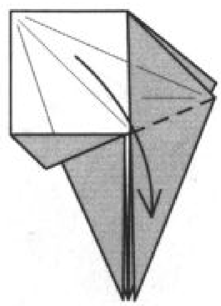
Fold the flap up to the left.

10



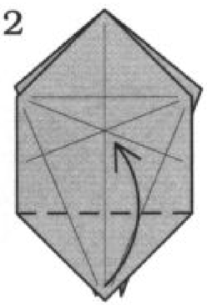
Pull out the trapped layer.

11



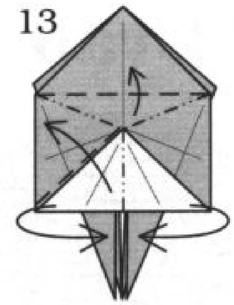
And fold the flap back down.

12



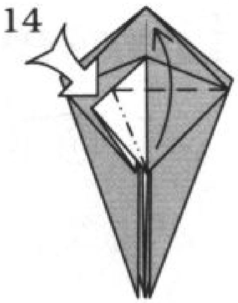
Fold the bottom point up to the intersection of the two creases.

13



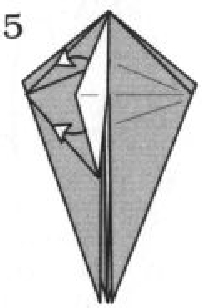
Bring the lower corners together, folding on existing creases.

14



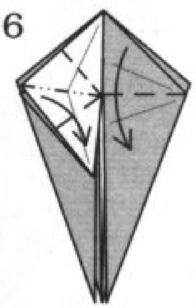
Squash-fold.

15



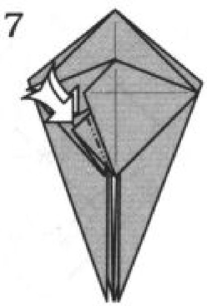
Pull out the trapped layer of paper.

16



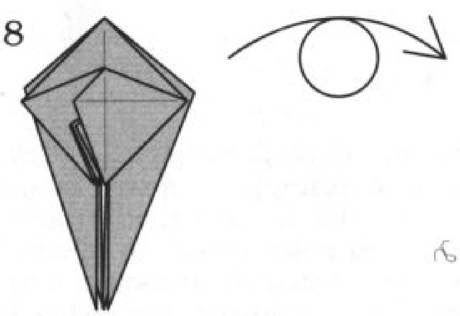
Fold half of a Preliminary Fold with the single layer.

17



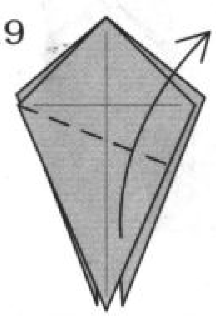
Reverse-fold both edges.

18



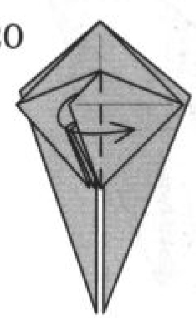
Turn the model over.

19



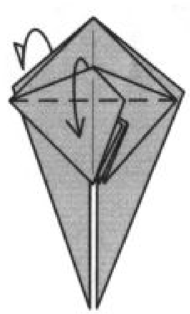
Repeat steps 6–17 on this side.

20



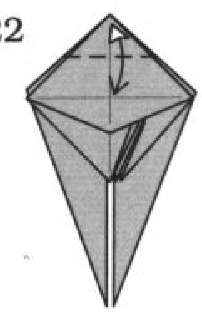
Fold the bundle of layers over to the right.

21



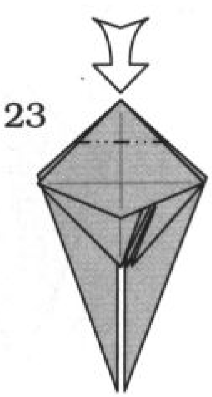
Fold the layer down in front and behind.

22



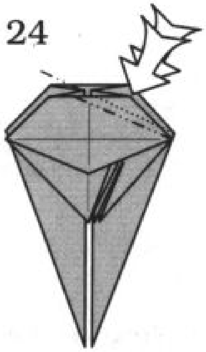
Fold and unfold.

23



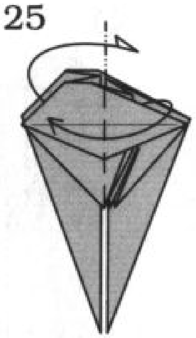
Sink the point downward.

24



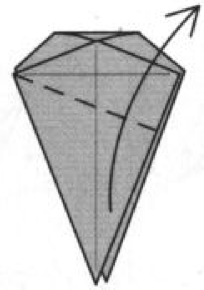
Sink two corners. They must be done simultaneously.

25



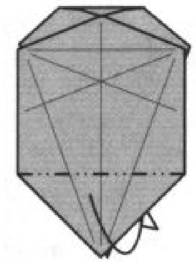
Fold one layer to the left in front and one to the right in back.

26



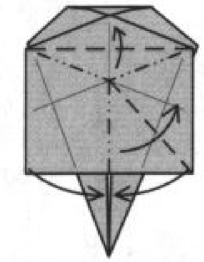
Repeat steps 6–11 on this flap.

27



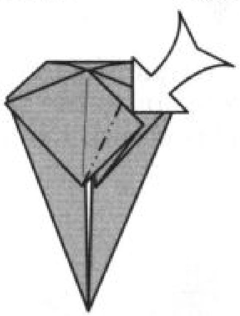
Mountain-fold the point underneath.

28



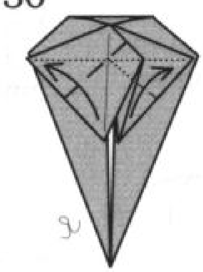
Bring the lower corners together as in step 13.

29



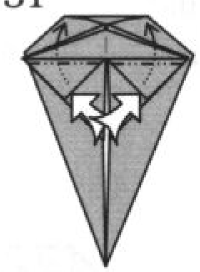
Reverse-fold the edge.

30



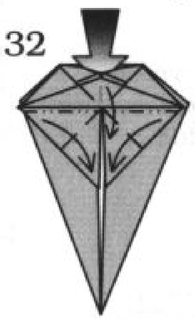
Valley-fold the two lower corners up to the sides.

31



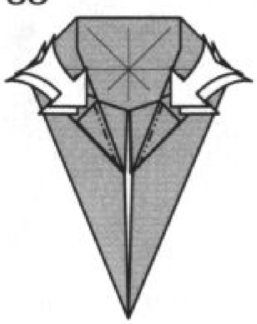
Reverse-fold the corners.

32



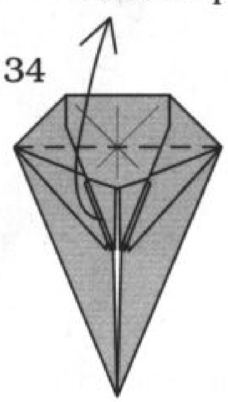
Fold a Preliminary Fold through all of the thick layers.

33



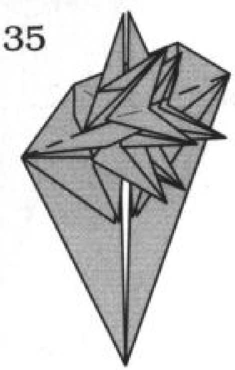
Reverse-fold four edges.

34



Lift the top pair of points upward as far as possible, letting the other four pairs fan out.

35



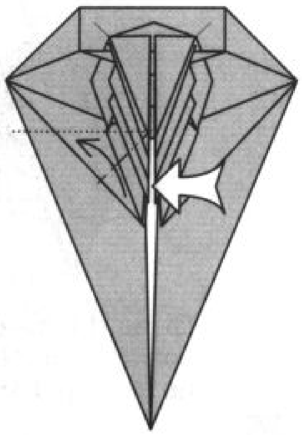
Like this.

36



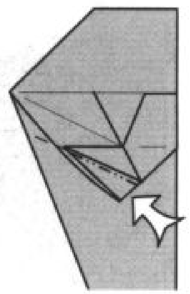
Press in between the points and flatten them all downward, spacing them evenly. The dotted line indicates where the top pair folds down.

37



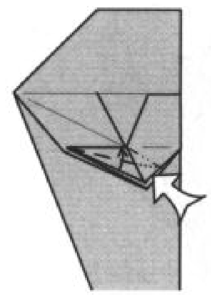
Like this. Reverse-fold the lowest corner out to the side.

38



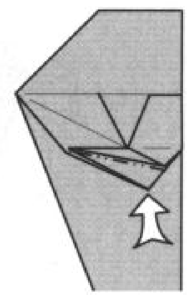
Only the lowest point is shown in steps 38–40. Reverse-fold the lower edge.

39



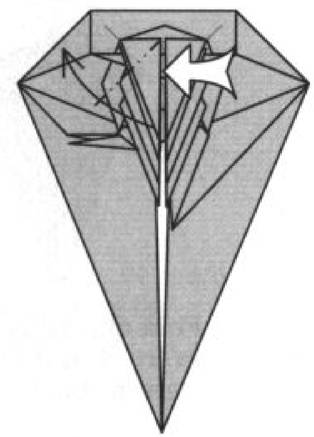
Reverse-fold a single edge.

40



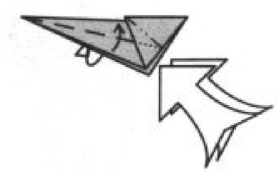
Sink the corner and edges.

41



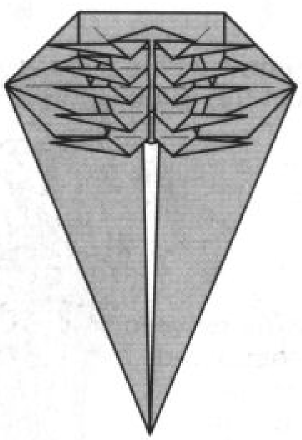
Reverse-fold the remaining four points on this side out to the side (only the top one is shown here).

42



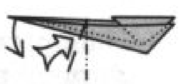
Reverse-fold both edges of each point to narrow it. Repeat on the other four points.

43



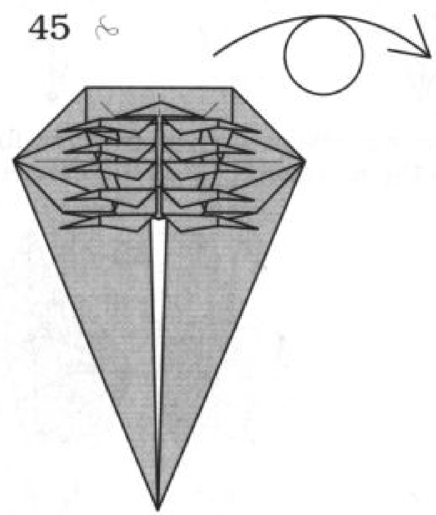
Repeat steps 37–42 on the right side.

44



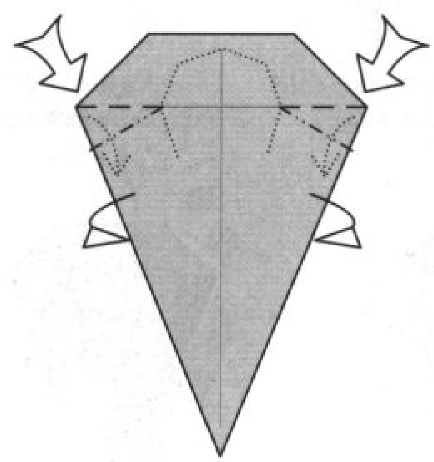
Tuck the upper half of each leg inside the lower half, as shown.

45



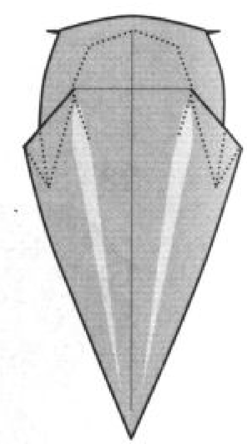
Like this. Turn the paper over.

46



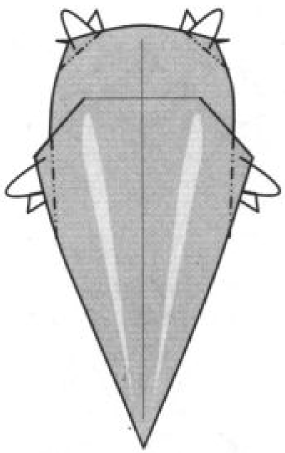
Round the body and crimp the corners as shown. Although it is difficult, the model will hold together better if you make each crimp symmetrical, thus making a closed sink of each corner.

47



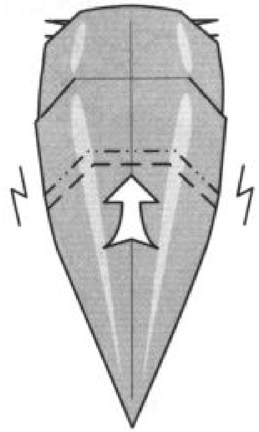
Like this.

48



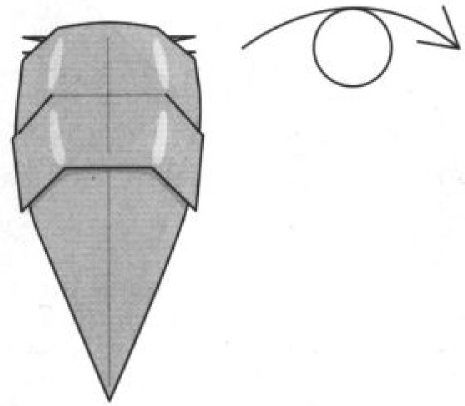
Mountain-fold the corners underneath.

49



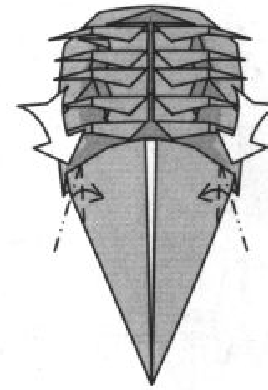
Pleat the model as shown.

50



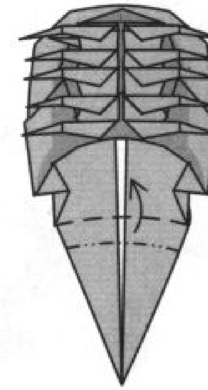
Like this. Turn the model over.

51



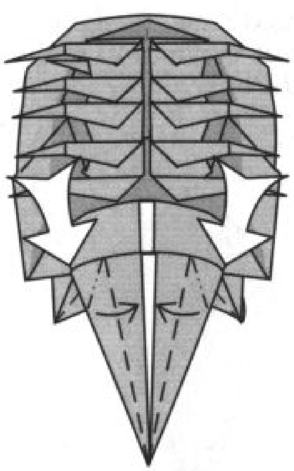
Swivel-fold the corners.

52



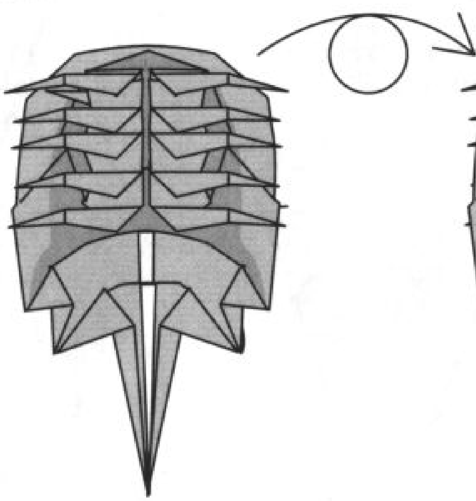
Pleat again.

53



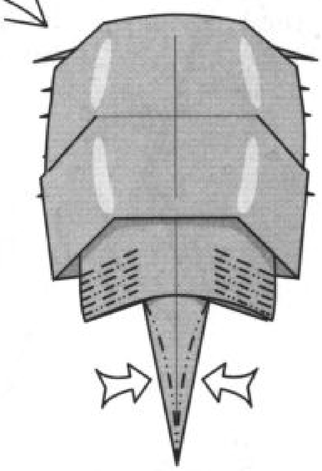
Swivel-fold the corners again.

54



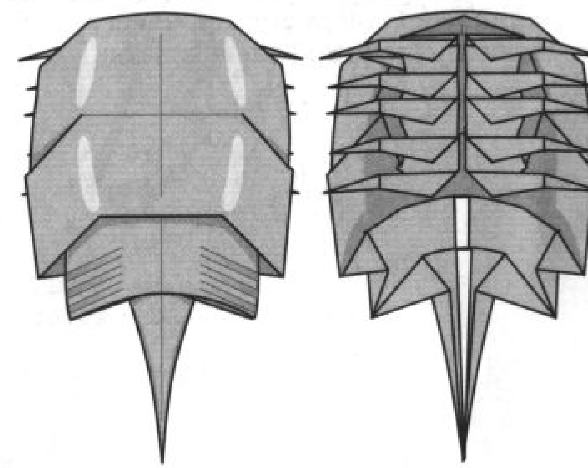
Like this. Turn the model over.

55



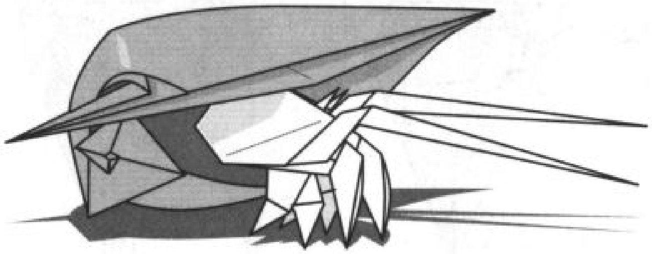
Pinch the tail to shape it and pleat the sides of the shell.

56



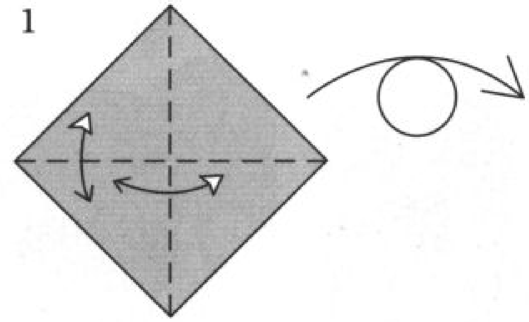
Horseshoe Crab

Hermit Crab



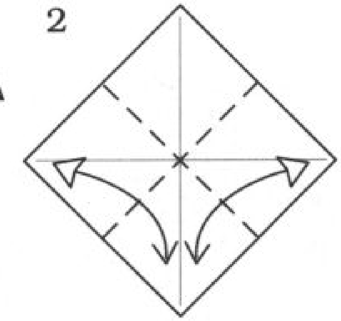
Hermit Crabs are represented by two families, *Coenbitoidea* and *Panguroidea*. Representatives of both families are notable in that they live inside the deserted shell of another animal, typically a whelk or snail. The rear of the hermit crab is soft and its hind legs are atrophied, except for a single pair used to hold the crab inside the shell. The crab keeps the shell until it outgrows it and must find another. Hermit crabs come in a rainbow of colors and make very good pets as they are clean and require little attention.

1



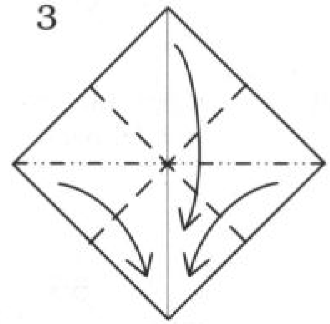
Crease the diagonals. Turn the model over.

2



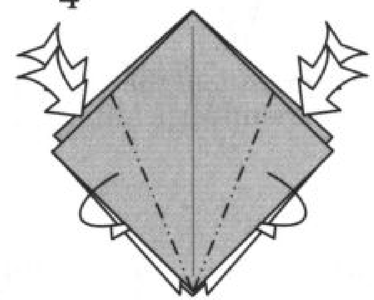
Crease in half and unfold.

3



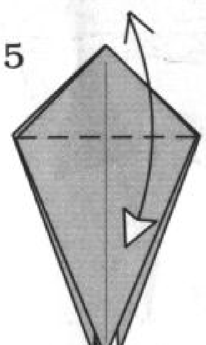
Fold a Preliminary Fold.

4



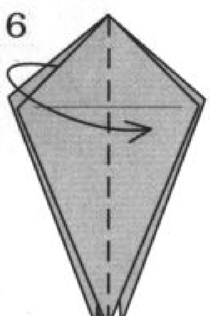
Enlarged view. Reverse-fold four corners to make a Bird Base.

5



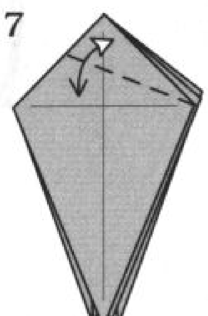
Enlarged view. Fold and unfold.

6



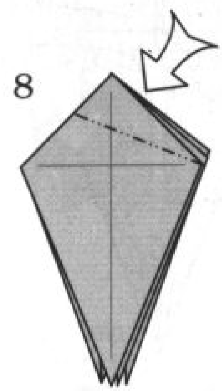
Fold one layer over from left to right.

7



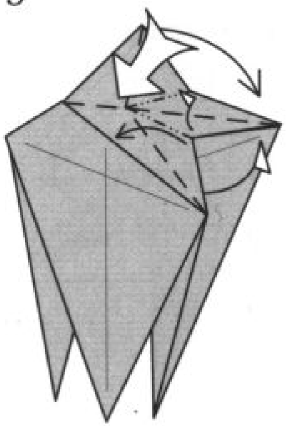
Crease.

8



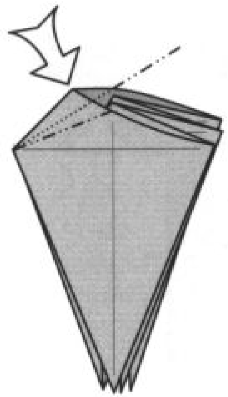
Open the top point out and sink it on the existing creases.

9



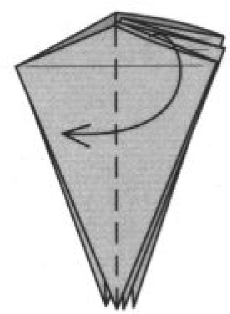
In progress.

10



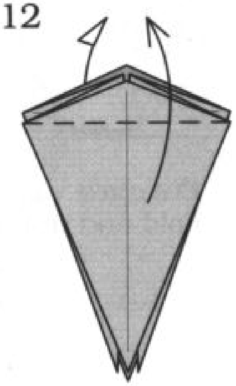
Sink the remaining corner.

11



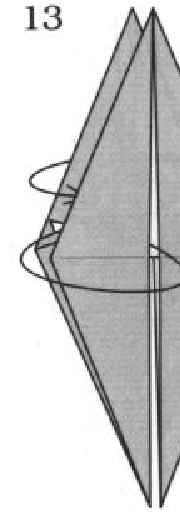
Fold one layer over to the left.

12



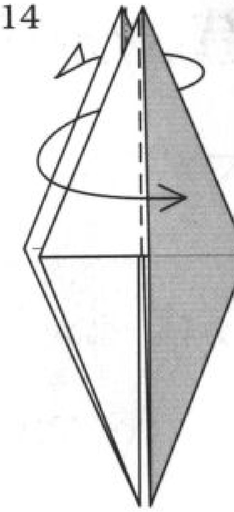
Fold one point up in front and in back.

13



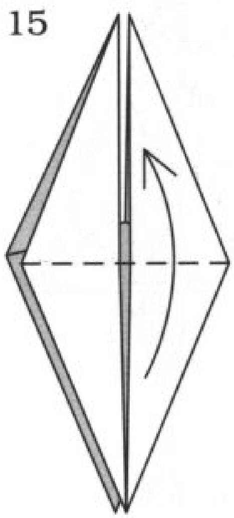
Color-change both of the flaps on the left.

14



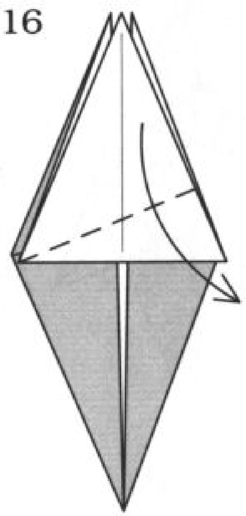
Fold one layer from left to right in front and one from right to left in back.

15



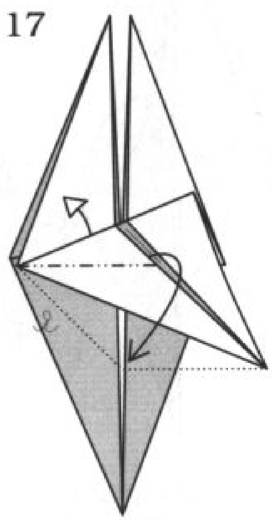
Lift up one point.

16



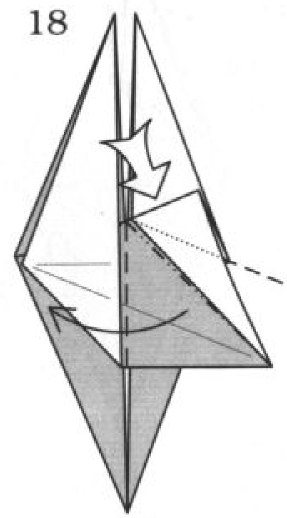
Fold the point down along a line perpendicular to the right edge.

17



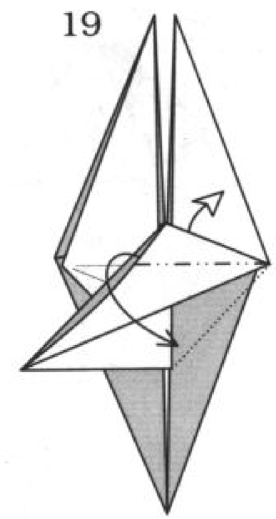
Pull out the loose paper.

18



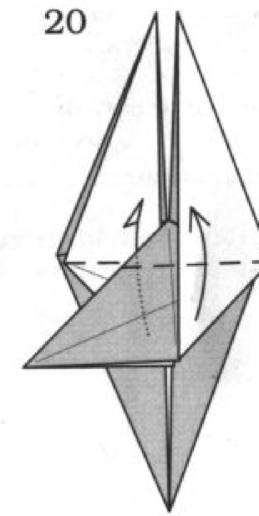
Squash-fold.

19



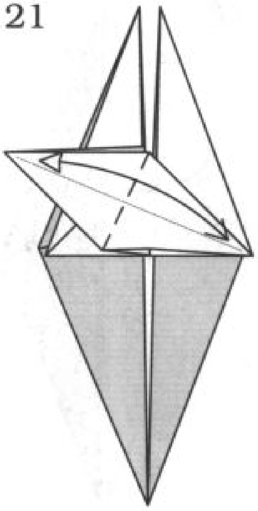
Pull out the loose paper.

20



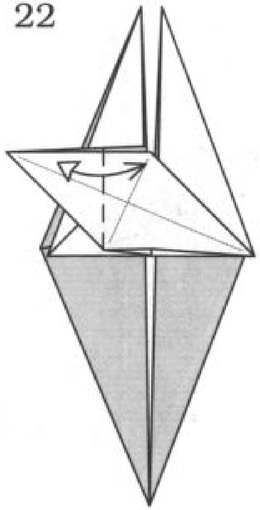
Outside-reverse-fold the flap upward.

21



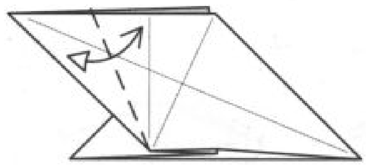
Fold and unfold.

22



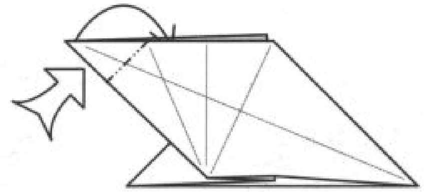
Fold and unfold.

23



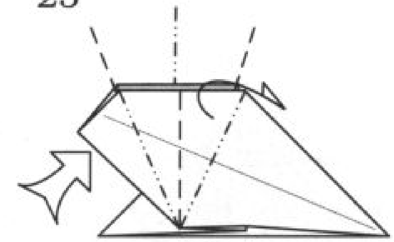
Enlarged view.
Fold and unfold.

24



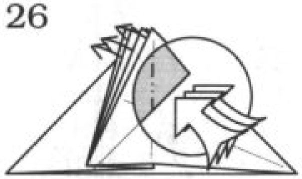
Reverse-fold
the corner.

25



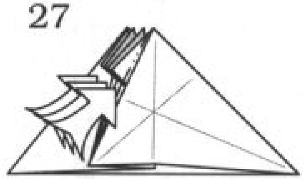
Crimp symmetrically.

26



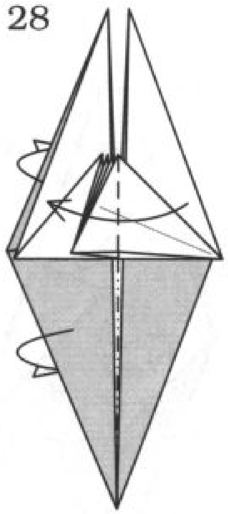
Reverse-fold three
hidden corners.

27



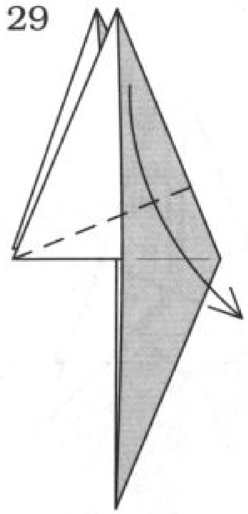
Reverse-fold the
three corners again.

28



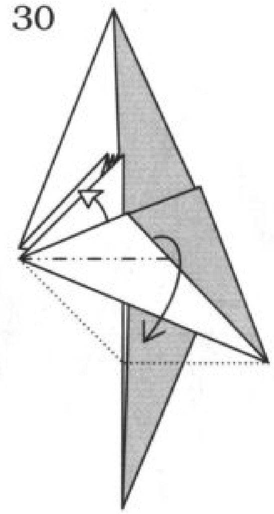
Fold one white
layer over to the
left in front and
one colored layer
over to the right
behind.

29



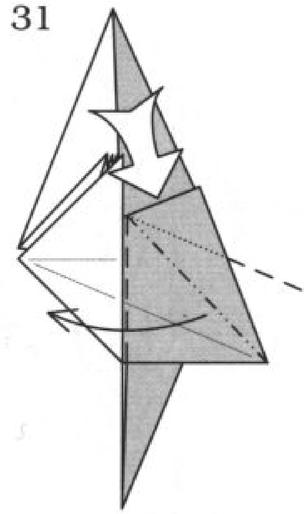
Fold one point
down along a line
perpendicular to
the right edge.

30



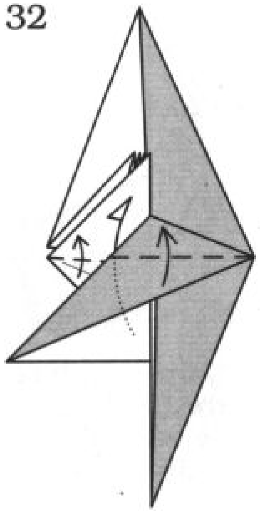
Pull out the
loose paper.

31



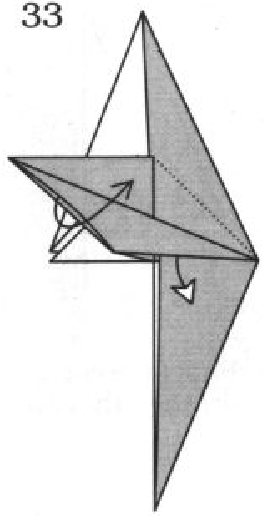
Squash-fold.

32



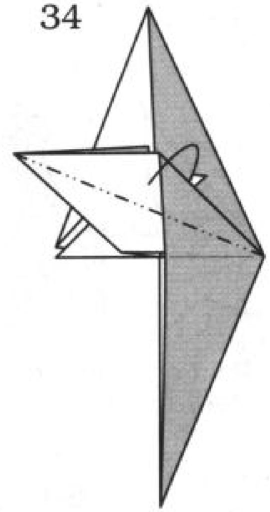
Outside-reverse-fold the flap.

33



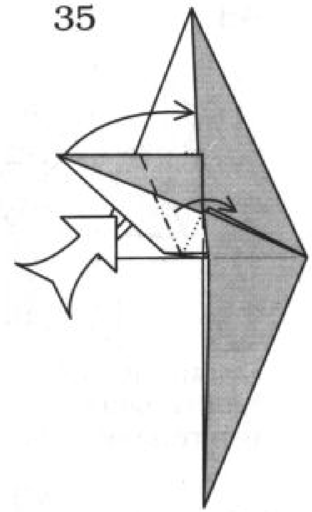
Pull out the loose paper.

34



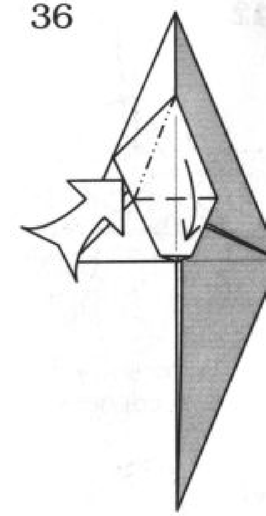
Mountain-fold one layer inside.

35



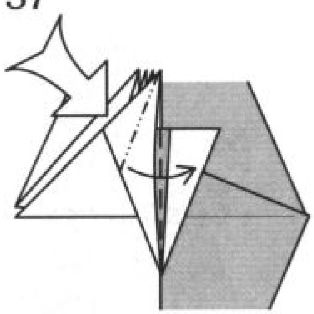
Squash-fold the flap (note the interior layers that must also be squash-folded).

36



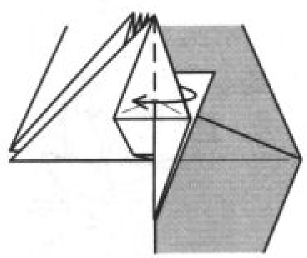
Petal-fold the left half of the flap.

37



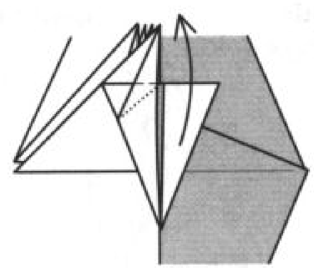
Enlarged view. Squash-sink the corner.

38



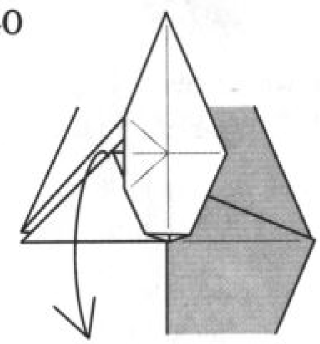
Fold one layer back to the left.

39



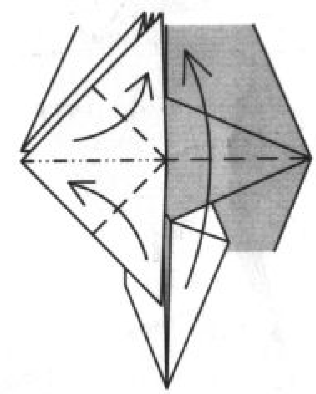
Stretch the point upward as far as it will go.

40



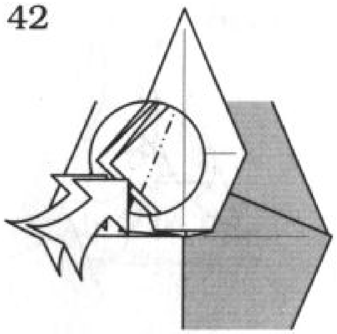
Fold down one layer from the left; the long flap comes too.

41



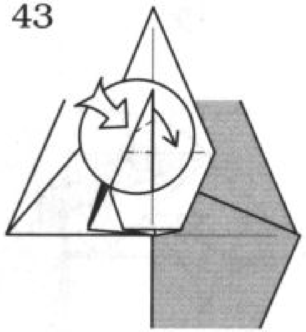
Form half of a Preliminary Fold from the left side and fold the point upward.

42



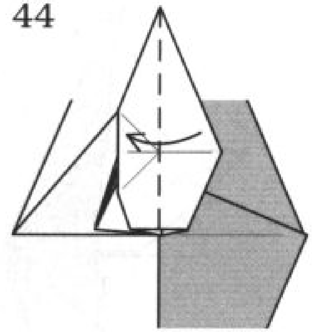
Reverse-fold the two corners.

43



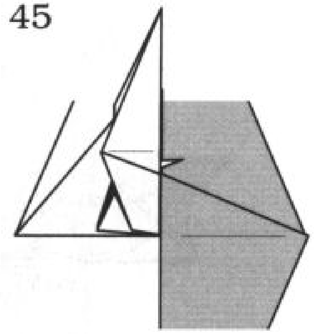
Crimp the tiny hidden point with two reverse folds.

44



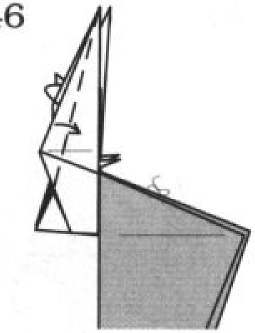
Fold one layer from right to left.

45



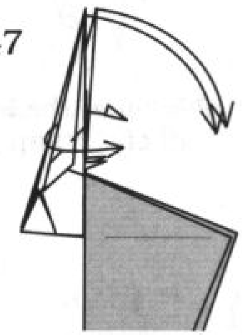
Repeat steps 29–45 on the other side.

46



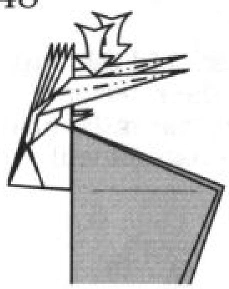
Narrow each of the two long points with valley folds.

47



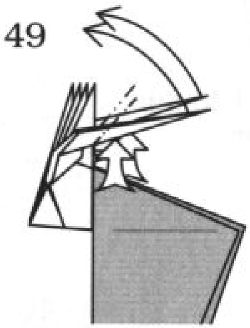
Outside-reverse-fold.

48



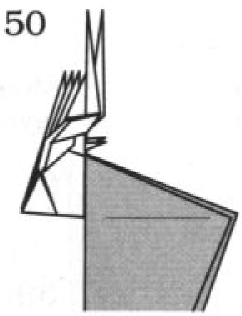
Sink the edges to narrow the points.

49



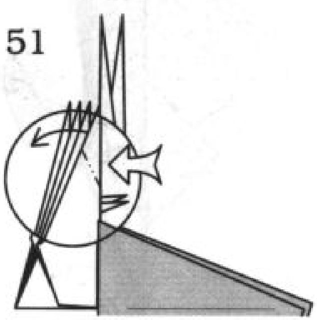
Inside-reverse-fold.

50



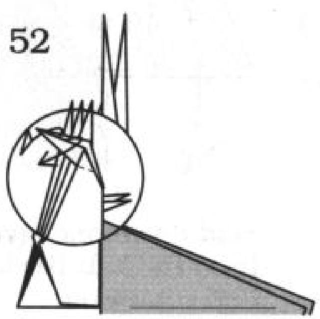
Like this.

51



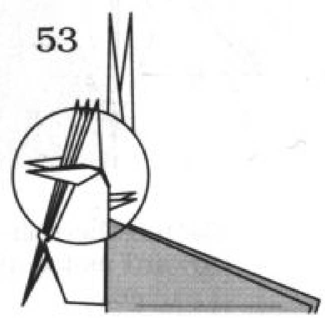
Enlarged view. Reverse-fold the next point. Repeat behind.

52



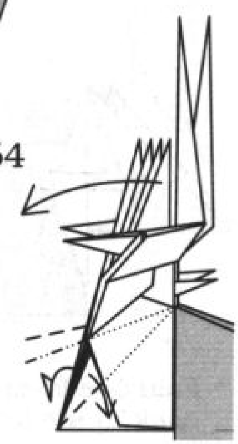
Outside-reverse-fold the point. Repeat behind.

53



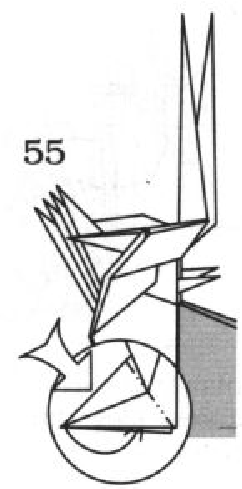
Like this.

54



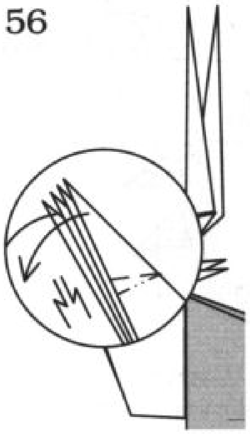
Crimp the group of four points downward.

55



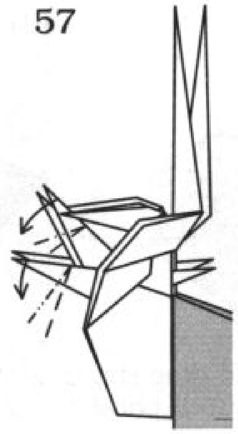
Reverse-fold the middle corner.

56



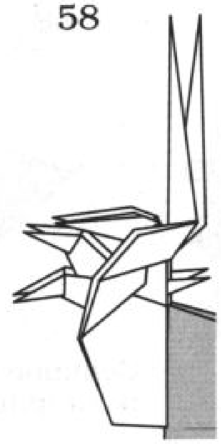
Crimp the outer pair of points downward.

57



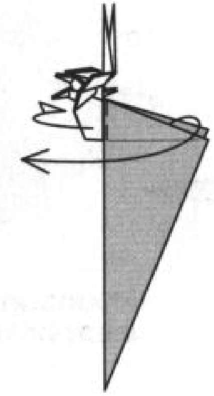
Crimp the tips of all four points downward.

58



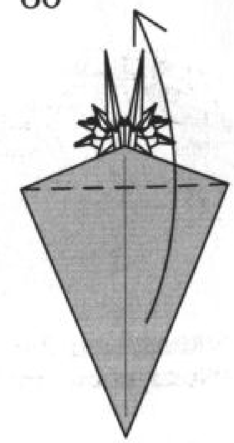
Like this.

59



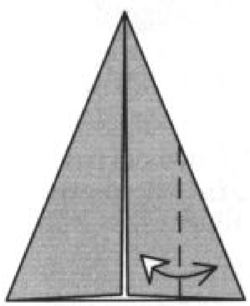
Fold one layer from the right to the left, and rotate the body of the crab away from you.

60



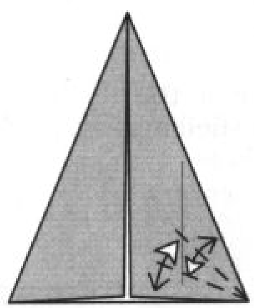
Fold the point upward.

61



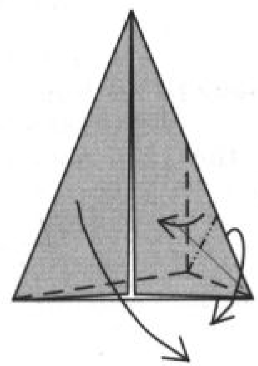
Crease lightly.

62



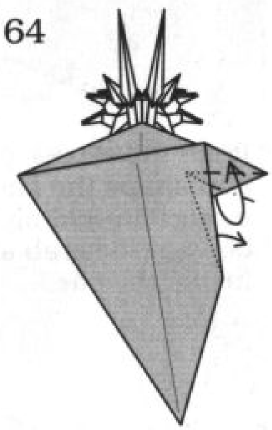
Fold and unfold.

63



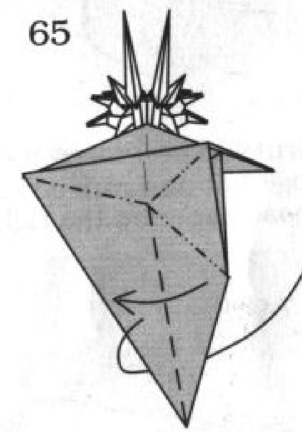
Fold a rabbit ear.

64



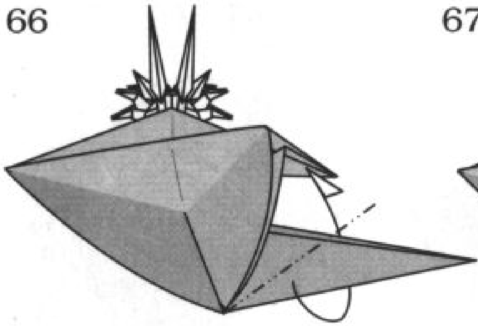
Swivel-fold.

65



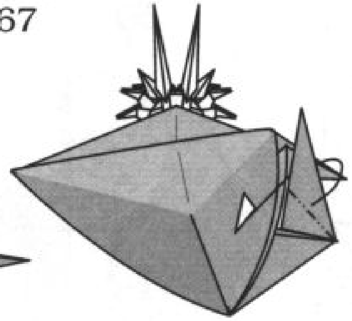
Fold a rabbit ear. The model becomes three-dimensional.

66



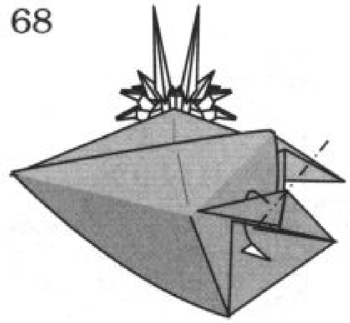
Mountain-fold the long point upward .

67



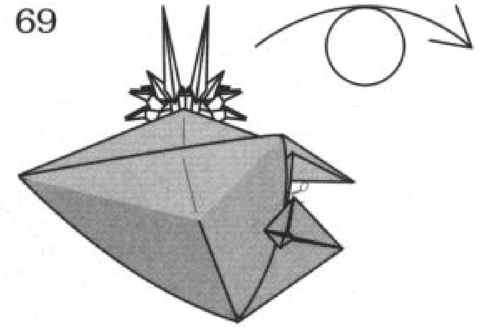
Mountain-fold the point behind again.

68



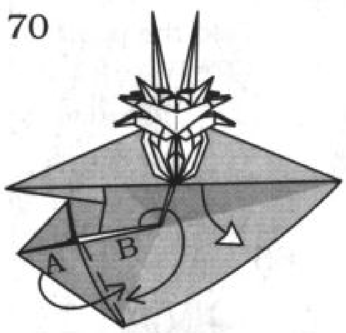
Continue mountain-folding the point until you run out of point.

69



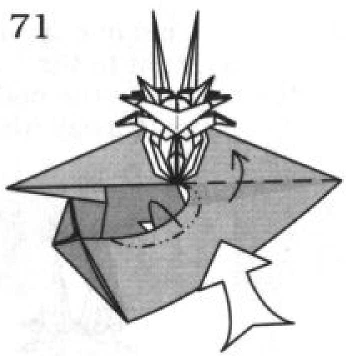
Like this. Turn the model over.

70



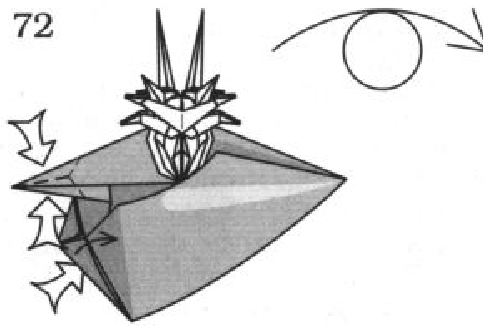
Bring points A and B together and pull out the loose paper on the right.

71



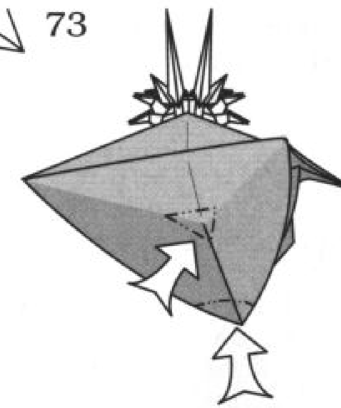
Push the excess paper upward and shape the shell by mountain-folding the rim; the body of the crab should be inside the shell.

72



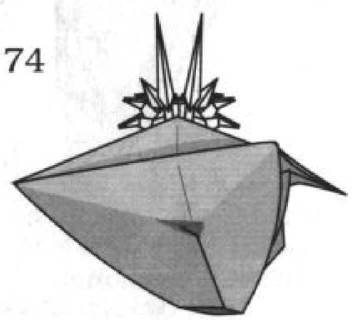
Pinch the spine on the left side of the shell and shape the left side.

73

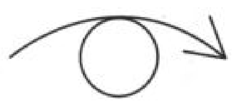


Sink the two corners shown; this helps the shell to keep its shape.

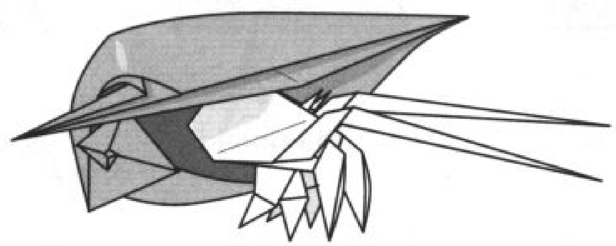
74



Like this. Turn the model over.

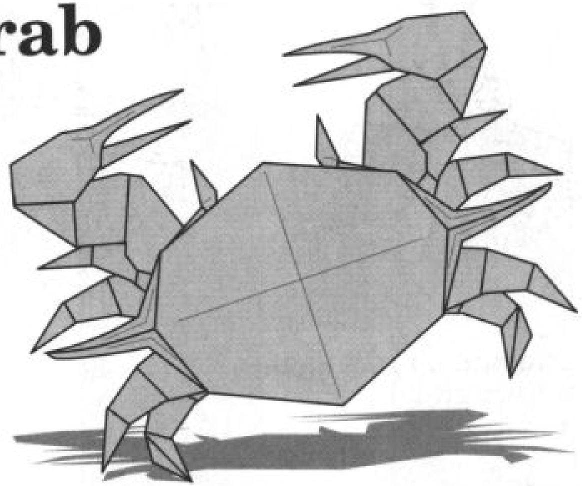


75



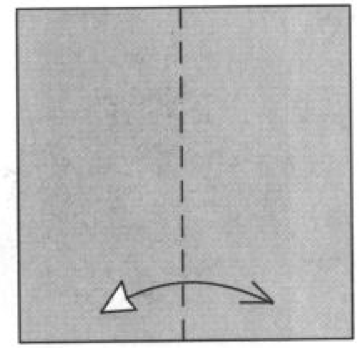
Hermit Crab

Blue Crab



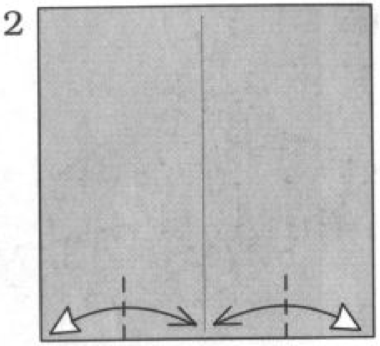
The Blue Crab (*Callinectes sapidus*) is a commercially important species that supports a fishing industry in Chesapeake Bay and all along the Atlantic and Gulf coasts. This species has been overexploited through the years and its numbers have been greatly reduced, but the population has now stabilized due to many fishing restrictions on size, sex, and season for harvest. Some fish farms are even experimenting to see if there is a practical method of culturing them. Blue crabs can get to be 5 or 6 inches across and have a hard shell that is blue above and white below. Immediately after molting, however, the shell is soft and papery, and they are sold (and devoured) as "soft-shell crab."

1



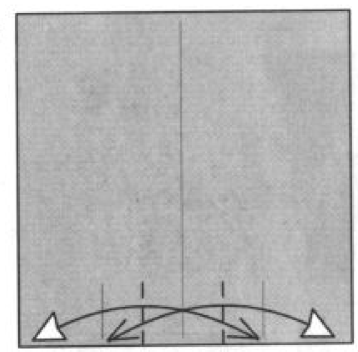
Fold the paper in half and unfold.

2



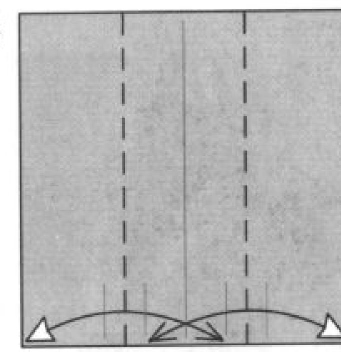
Fold the edges to the center, crease, and unfold.

3



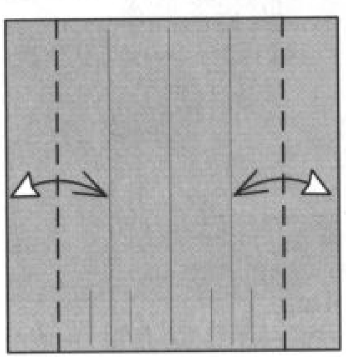
Fold and unfold.

4



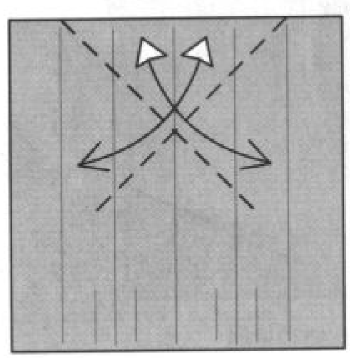
Fold and unfold.

5



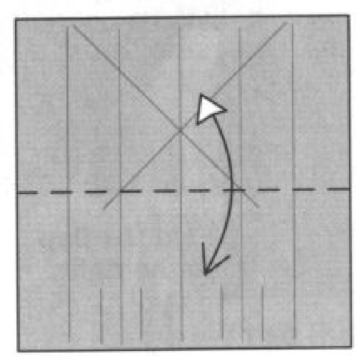
Fold and unfold.

6



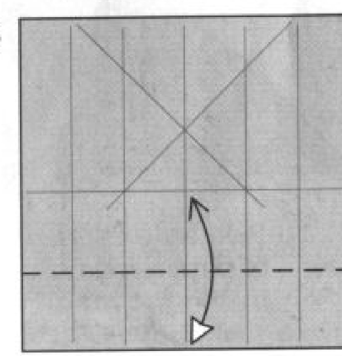
Fold and unfold.

7



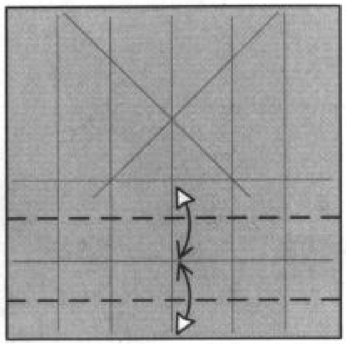
Fold and unfold.

8



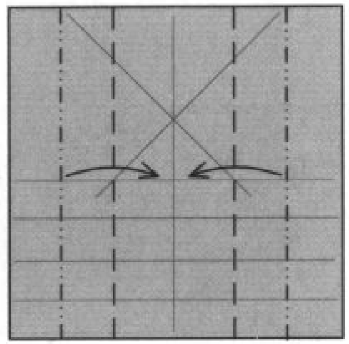
Fold and unfold.

9



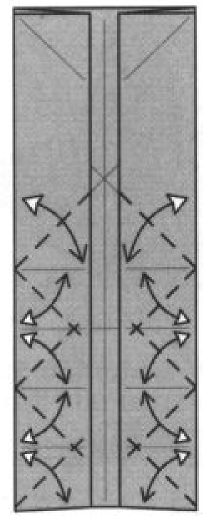
Fold and unfold.

10



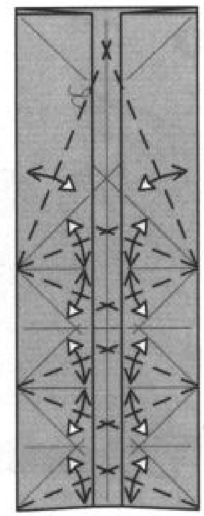
Pleat on existing creases.

11



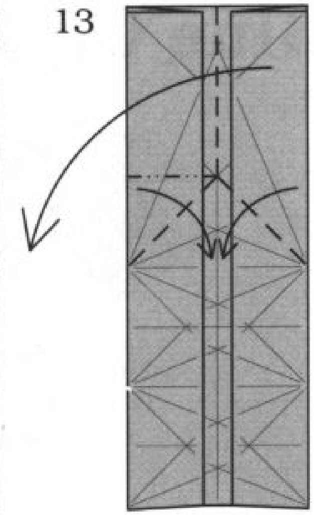
Fold and unfold.

12



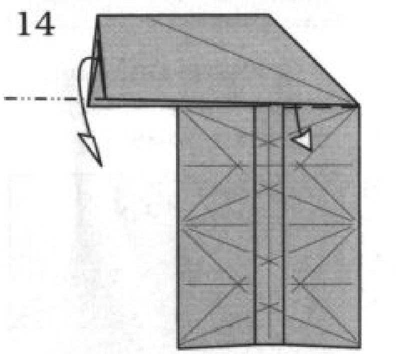
Fold and unfold.

13



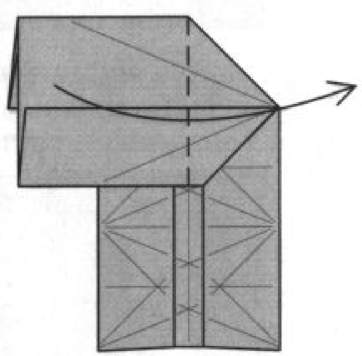
Fold a rabbit ear from the top of the paper.

14



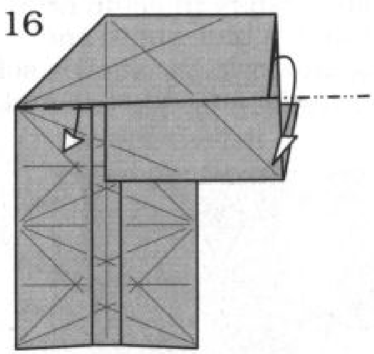
Fold a double layer of paper down from inside the rabbit ear.

15



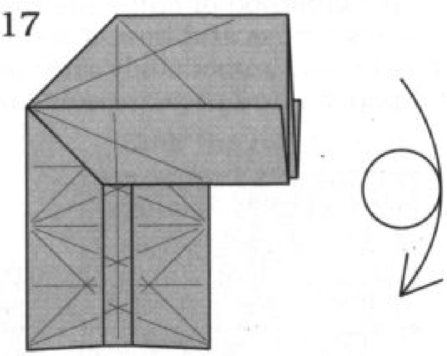
Fold the flap to the right.

16



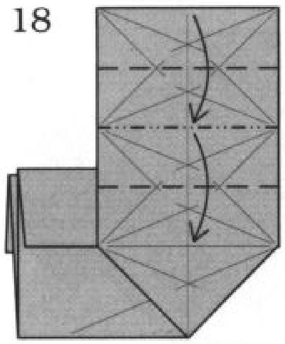
Repeat step 14.

17



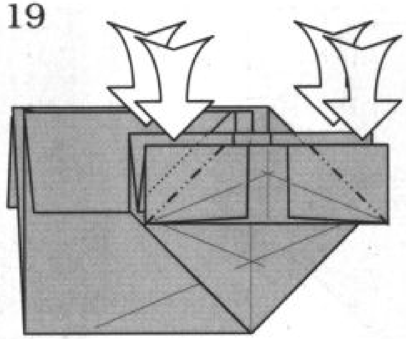
Like this. Turn the paper over from top to bottom.

18



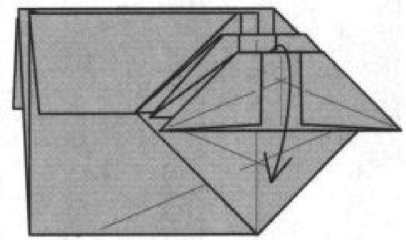
Pleat on existing creases.

19



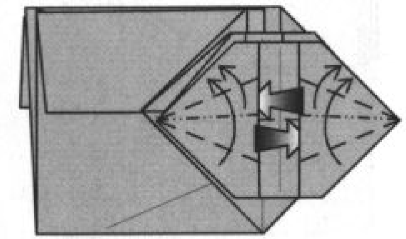
Reverse-fold four corners.

20



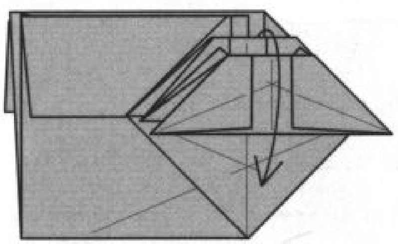
Fold one flap down.

21



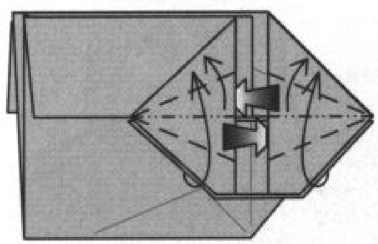
Fold it back up, incorporating the reverse folds shown.

22



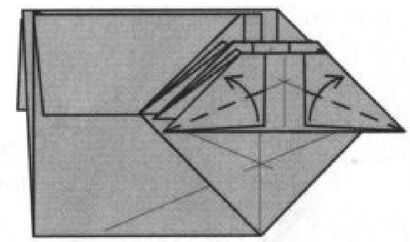
Fold two flaps down.

23



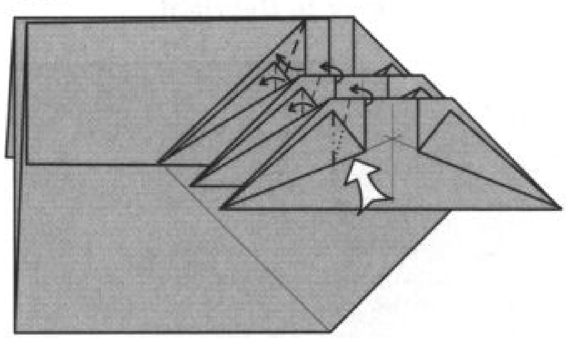
Fold them back up, incorporating the reverse folds shown.

24



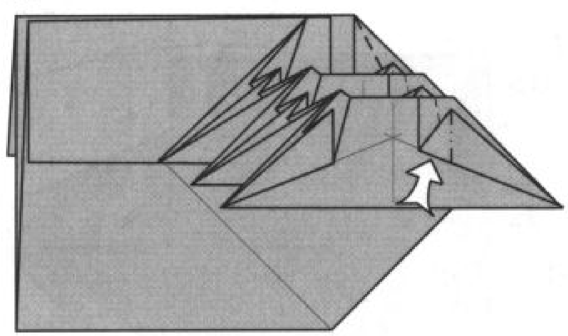
Valley-fold the flaps upward.

25



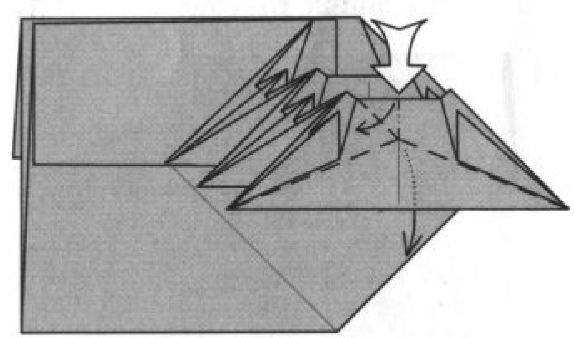
Reverse-fold all the layers on the left side of the pleats.

26



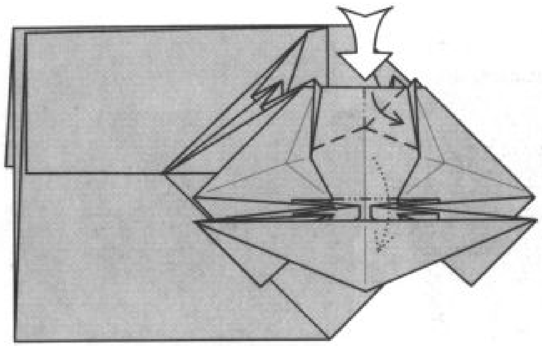
Reverse-fold the layers on the right.

27



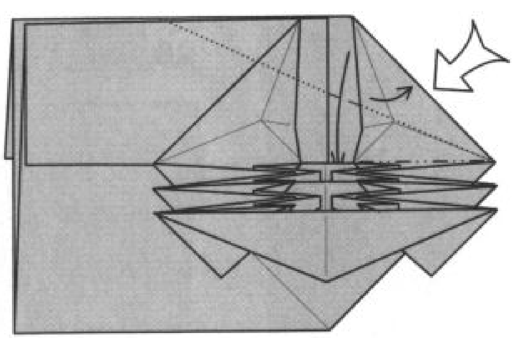
Push the middle of the top pleat down, making the small vertical pleat in the middle. The paper will not lie flat.

28



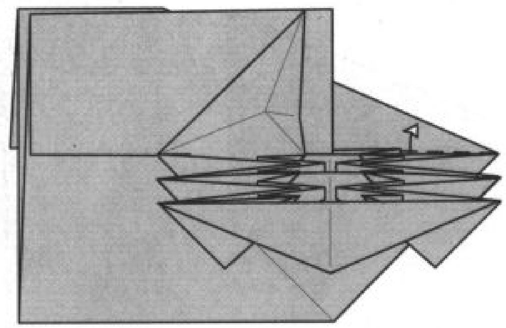
Repeat on the other pleat.

29



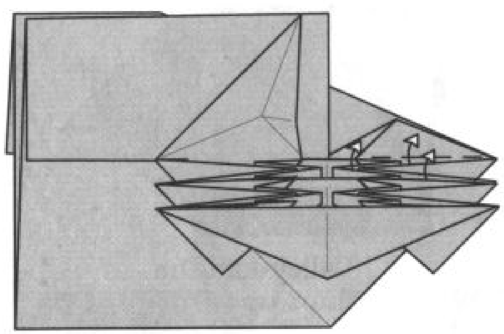
Reverse-fold the right edge and reassemble the creases that came unfolded in the previous step.

30



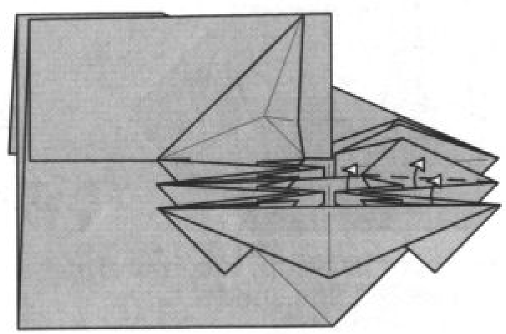
Pull out a single layer of paper from the double thickness rabbit ear to make it symmetric about a horizontal axis.

31



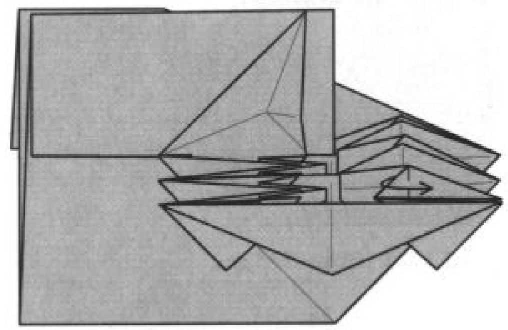
Again, pull out a single layer from the double thickness.

32



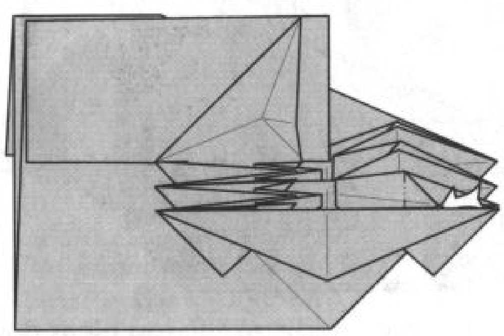
Again.

33



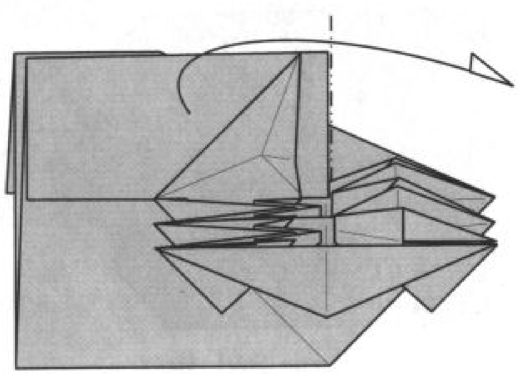
Fold the small flap over to the right.

34



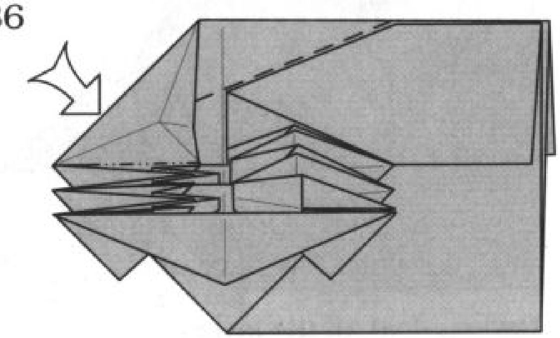
Sink the point into the interior of the model.

35



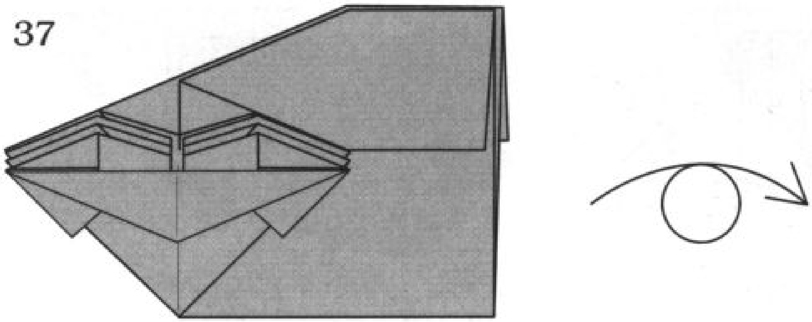
Fold the large flap over to the right.

36



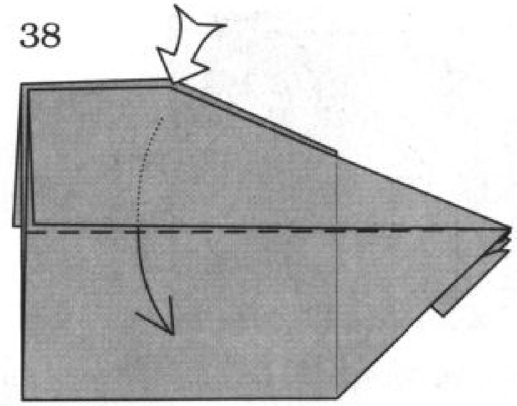
Repeat steps 29–34 on the left.

37



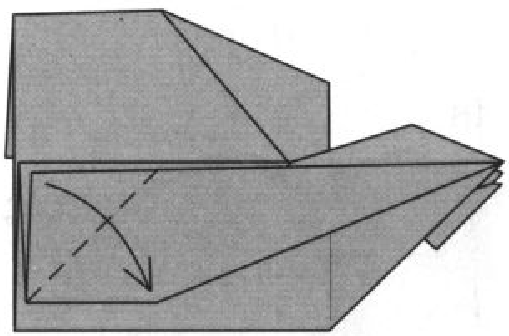
Like this. Turn the paper over.

38



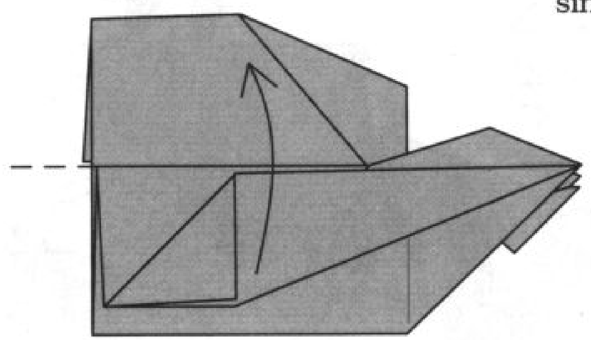
Fold the top flap down while sinking it inside-out.

39



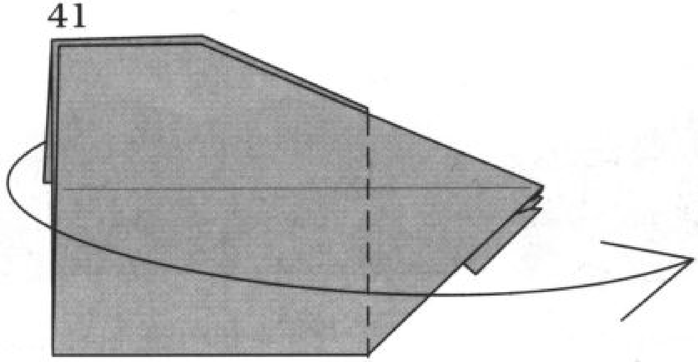
Fold the corner of the flap down.

40



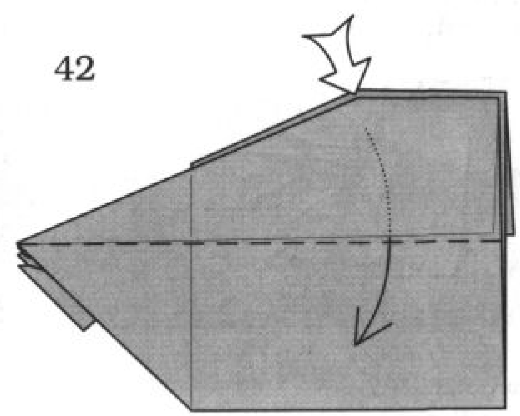
Fold the flap back up.

41



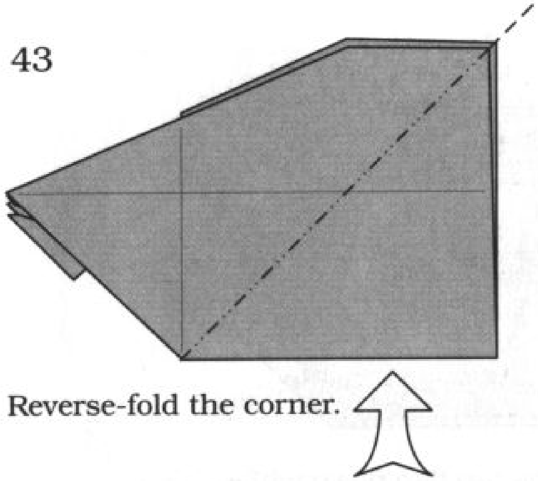
Fold both layers over to the right.

42



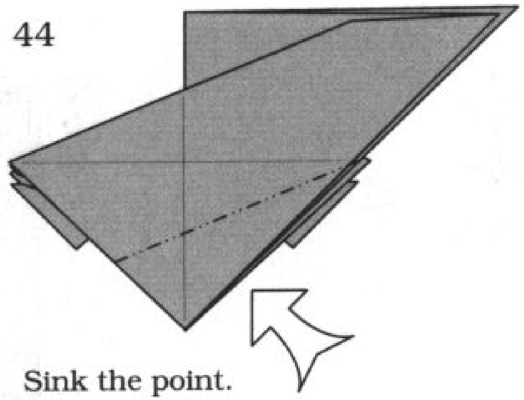
Repeat steps 37–40 on this side.

43



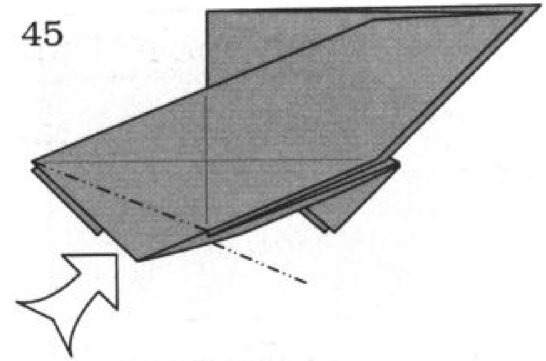
Reverse-fold the corner.

44



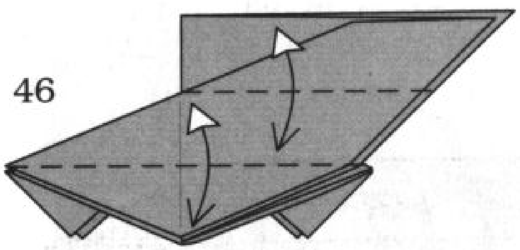
Sink the point.

45



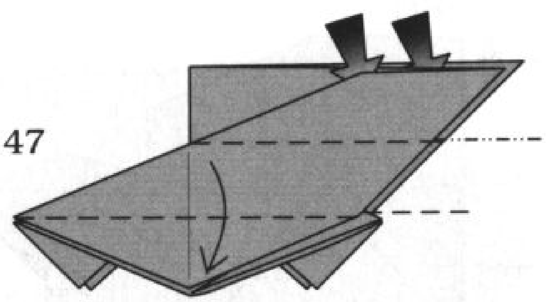
Sink the point.

46



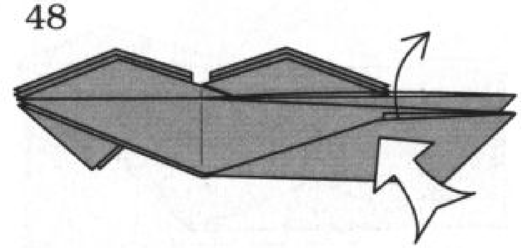
Fold and unfold.

47



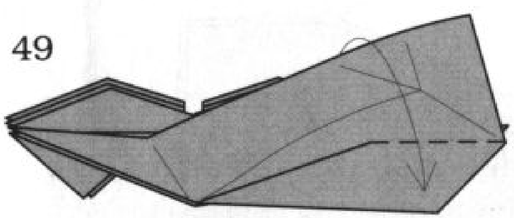
Pleat all layers individually, so that the two flaps remain separated.

48



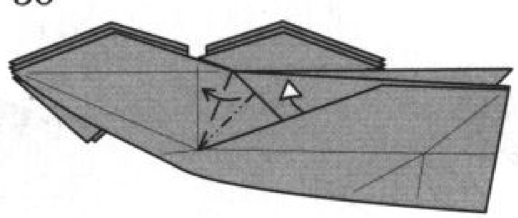
Grasp the original corner of the square that is inside the near flap and pull it entirely out of the flap.

49



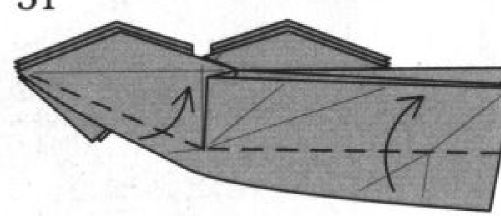
Fold down. The paper will not lie flat.

50



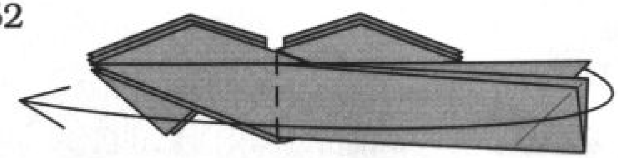
Crimp the paper toward the middle of the model and pull out the paper where shown.

51



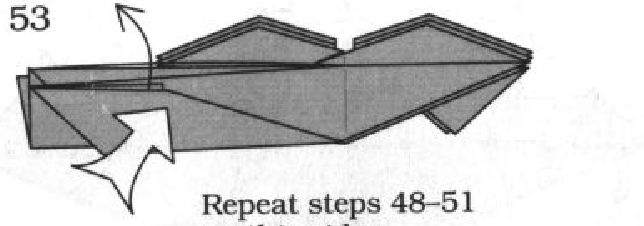
Close the flap back up.

52



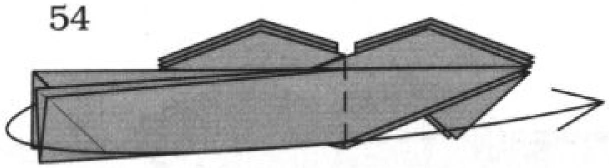
Fold both flaps
over to the left.

53



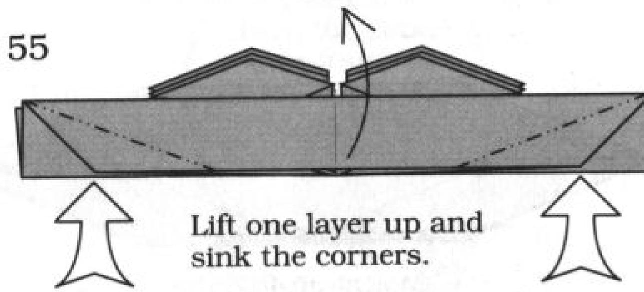
Repeat steps 48–51
on this side.

54



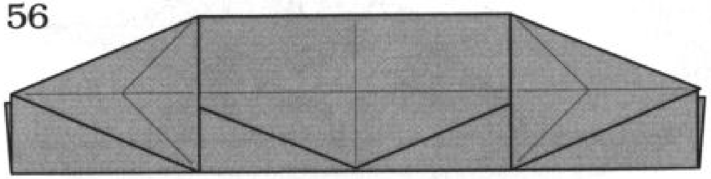
Fold one flap over to the left.

55

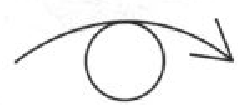


Lift one layer up and
sink the corners.

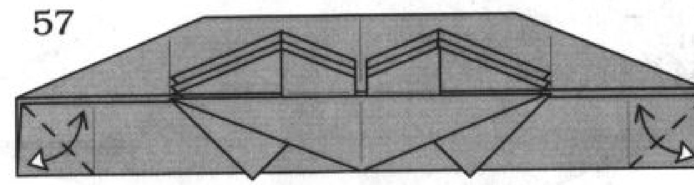
56



Like this. Turn the paper
over from side to side.

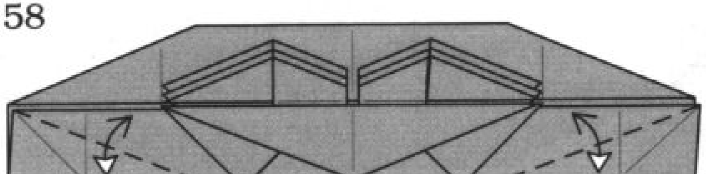


57



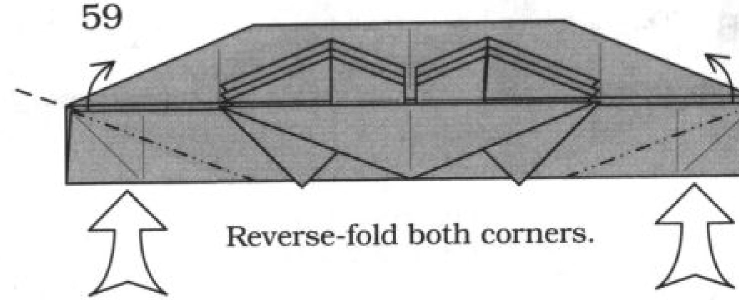
Fold and unfold.

58



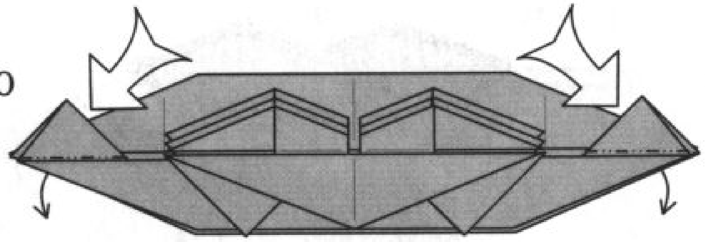
Fold and unfold.

59



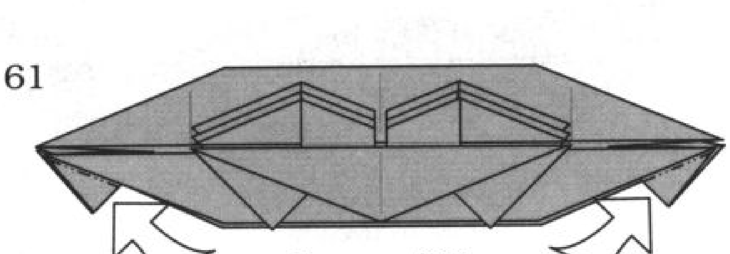
Reverse-fold both corners.

60



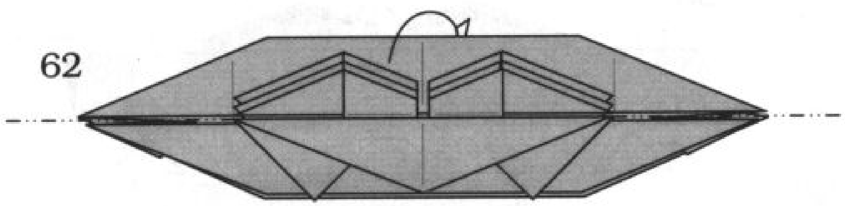
Reverse-fold both corners.

61



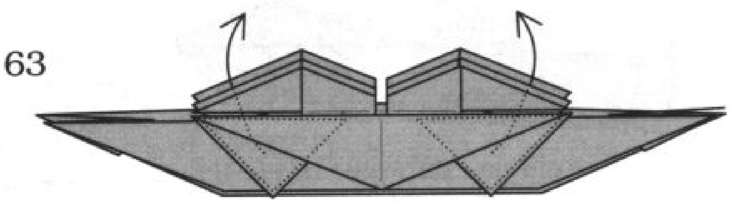
Reverse-fold.

62



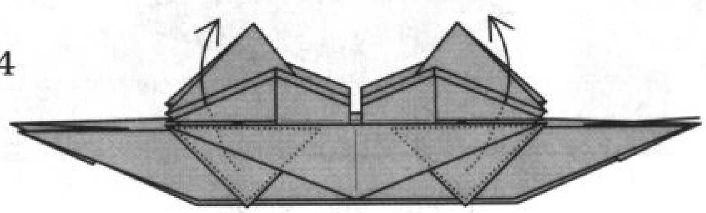
Mountain-fold the
top flap behind.

63



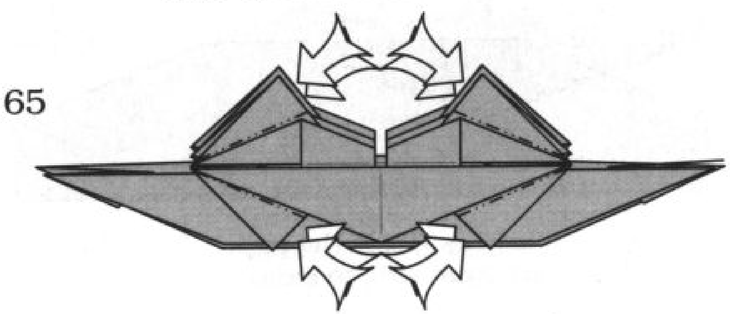
Reverse-fold two single-ply
flaps up from inside the model.

64



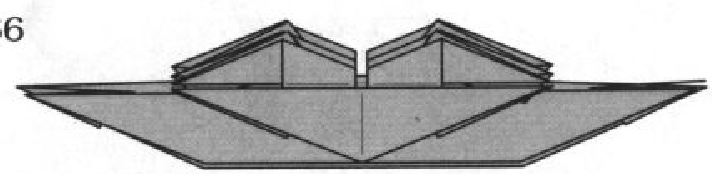
Reverse-fold the
other two such flaps.

65

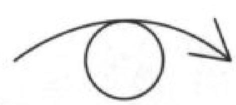


Reverse-fold four corners.

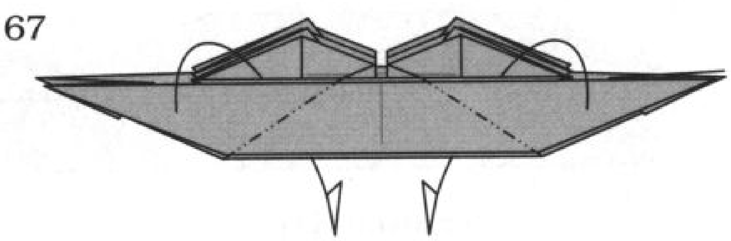
66



Like this. Turn
the paper over.

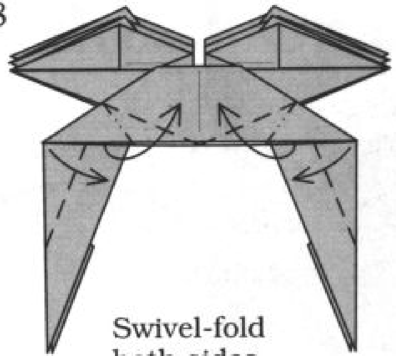


67



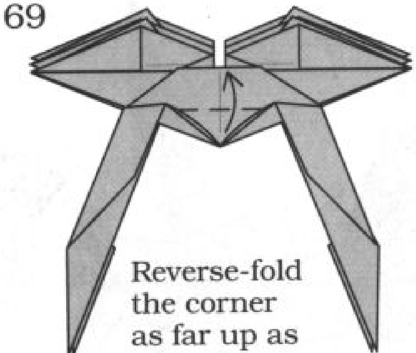
Mountain-fold the
two flaps downward.

68



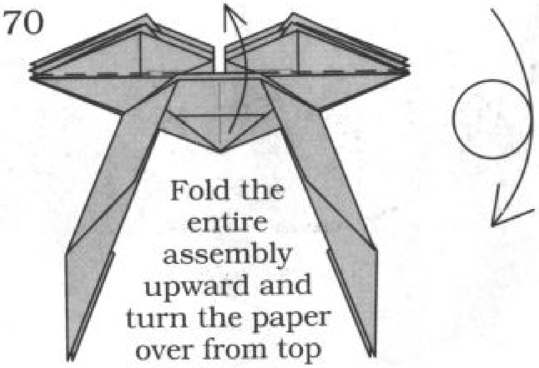
Swivel-fold both sides.

69



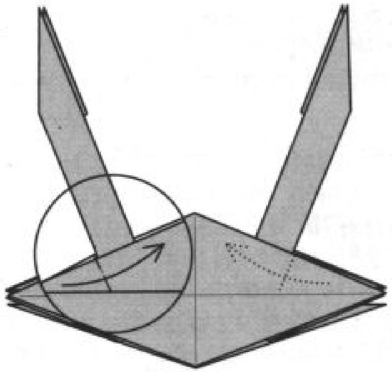
Reverse-fold the corner as far up as possible.

70



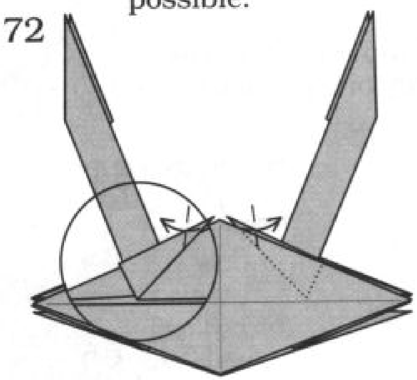
Fold the entire assembly upward and turn the paper over from top to bottom.

71



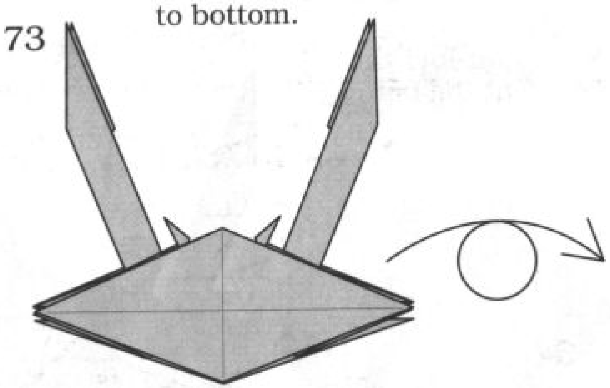
Valley-fold the top pair of hidden points to the center line.

72



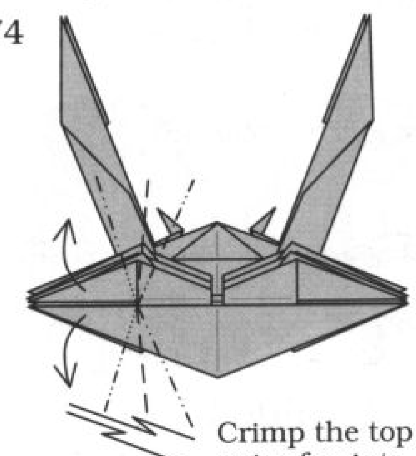
Valley-fold the tips of those same points upward.

73



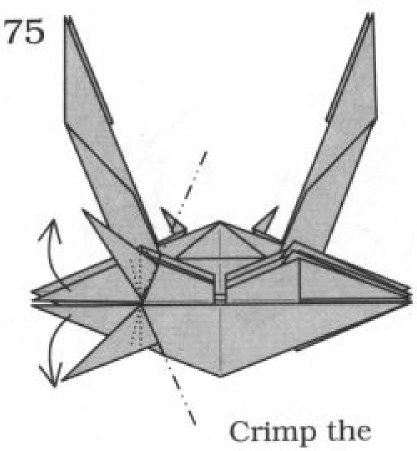
Like this. Turn the paper over from side to side.

74



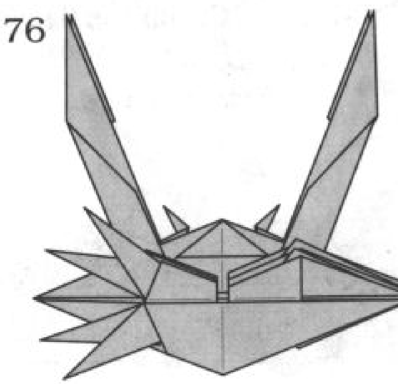
Crimp the top pair of points asymmetrically.

75



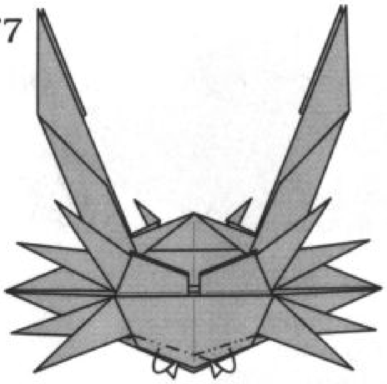
Crimp the next pair of points.

76



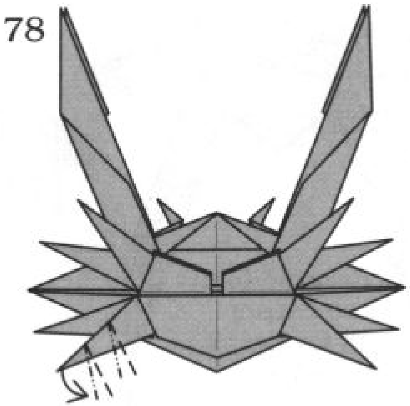
Like this. Repeat steps 74–75 on the right.

77



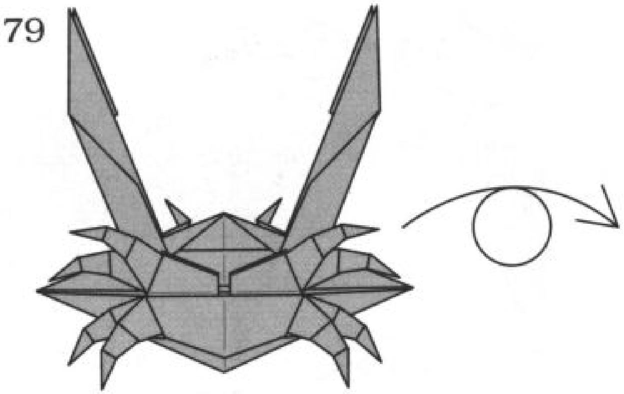
Mountain-fold the layers at the bottom.

78



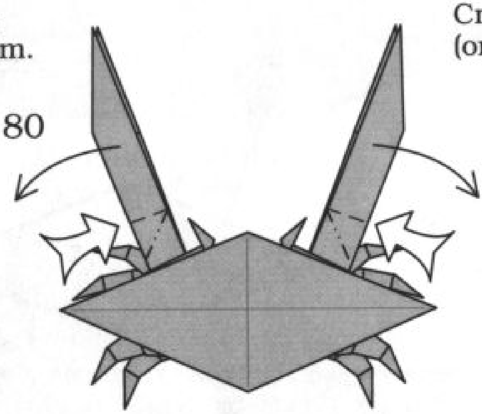
Crimp all of the legs (only one is shown here).

79



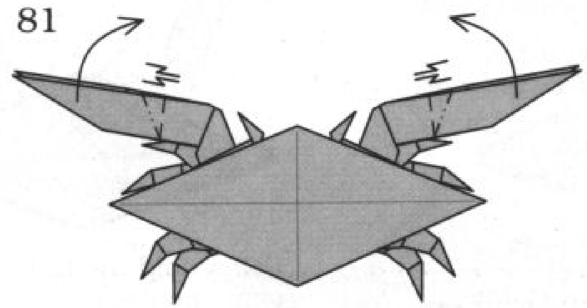
Like this. Turn the model over.

80



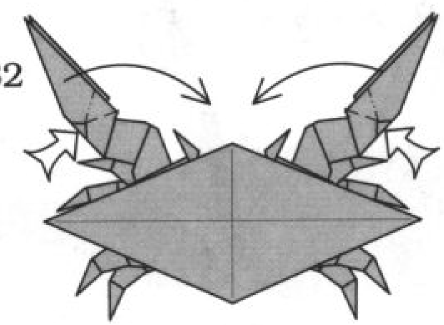
Crimp the two long flaps outward.

81



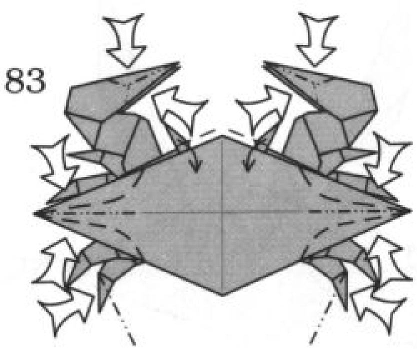
Crimp again.

82



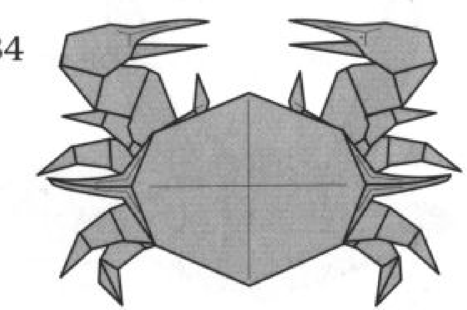
Squash-fold the claws toward each other.

83



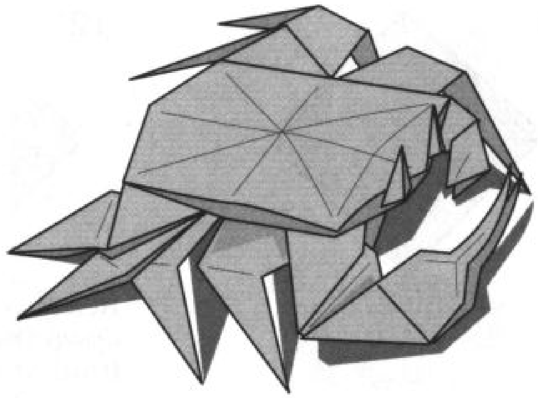
Pinch the tips of the claws and the spines on the sides of the shell. Shape the body to be three-dimensional, and squash-fold the bottommost pair of legs.

84



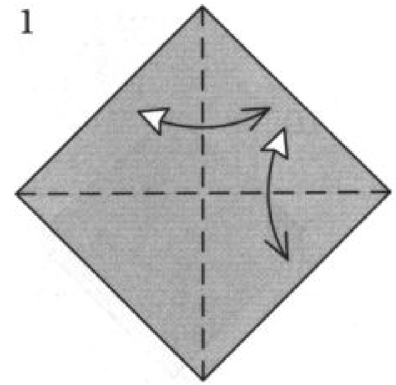
Blue Crab

Fiddler Crab



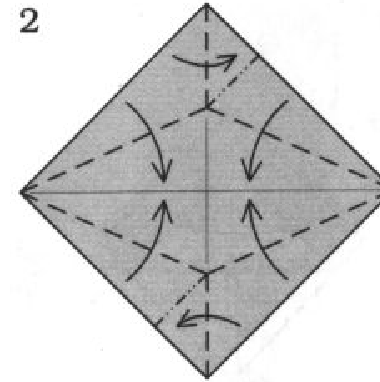
Fiddler Crabs are members of the genus *Uca* and are named for the single enlarged pincer possessed by the male of the species. They use their large claw primarily for courtship displays and battles with other males. If the claw breaks off, as occasionally happens, it will regenerate as a small claw while the other claw enlarges to take its place. Most are found in the mangrove swamps of the tropics, where they eat the detritus left by the receding tide. They are one of the most numerous inhabitants of the mangroves and as a result, are the prey of almost every larger creature.

1



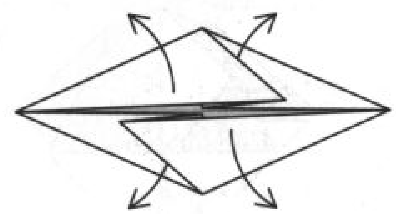
Crease the diagonals.

2



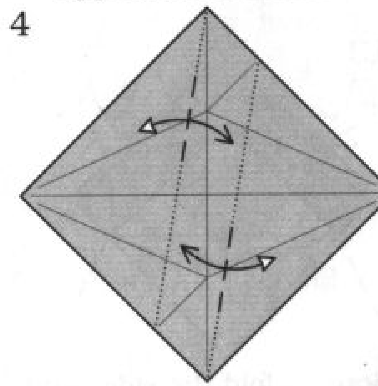
Fold two rabbit ears, with the points going in opposite directions.

3



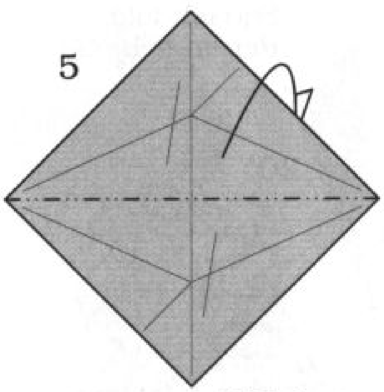
Unfold.

4



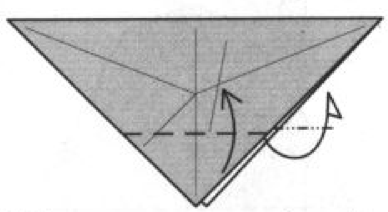
Crease as shown, making the creases sharp only where the dashed lines are.

5



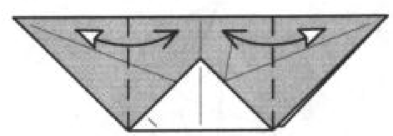
Mountain-fold the top half behind.

6



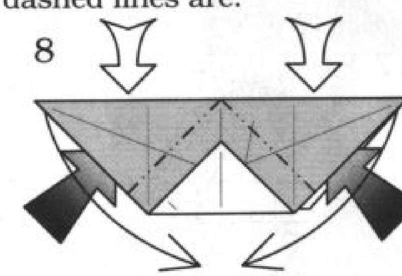
Fold the corner upward so that its edge hits the intersection shown; repeat behind.

7



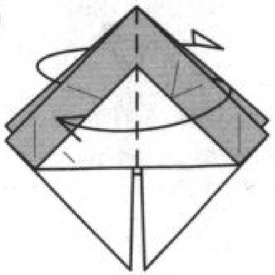
Fold and unfold.

8



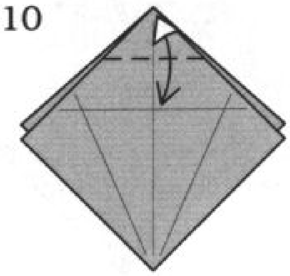
Reverse-fold two corners.

9



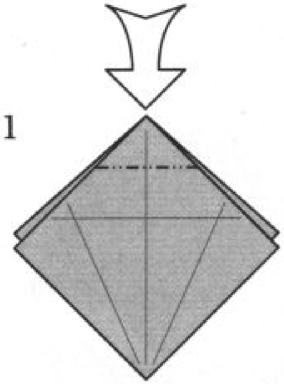
Fold one layer to the left in front and one to the right in back.

10



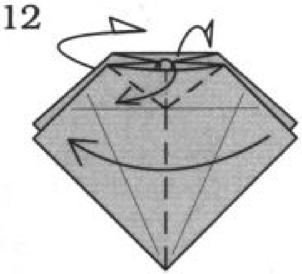
Fold and unfold.

11



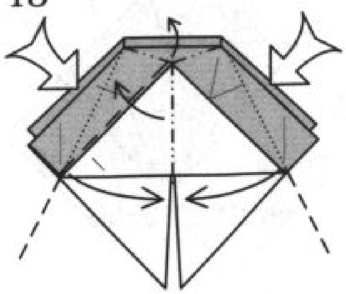
Sink.

12



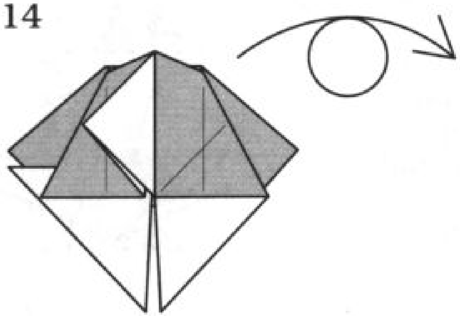
Repeat step 9, folding down the top edge in front and back.

13



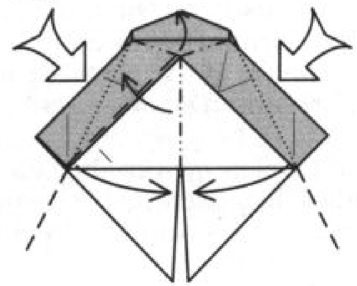
Squash-fold the sides and swing the white flap over to the left.

14



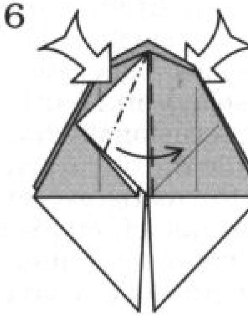
Like this. Turn the paper over.

15



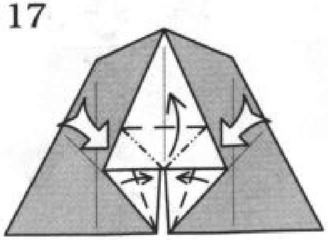
Repeat step 10 on this side.

16



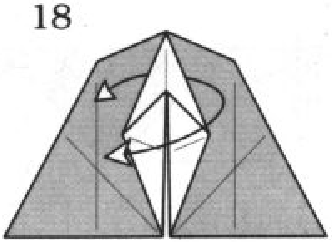
Squash-fold. Repeat behind.

17



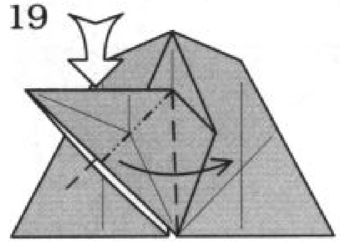
Enlarged view. Petal-fold.

18



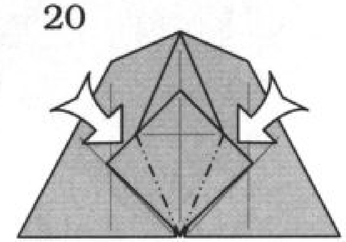
Unwrap one layer.

19



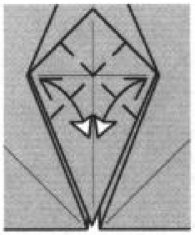
Squash-fold.

20



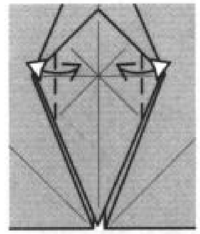
Reverse-fold the edges.

21



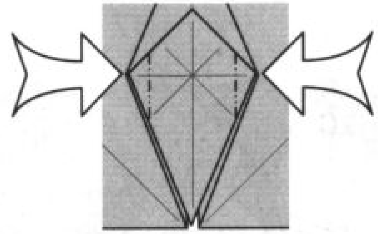
Enlarged view.
Fold and unfold.

22



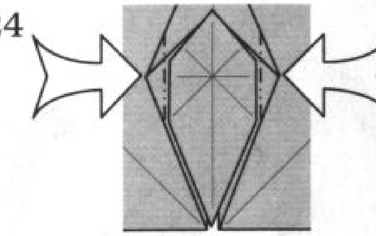
Fold and
unfold.

23



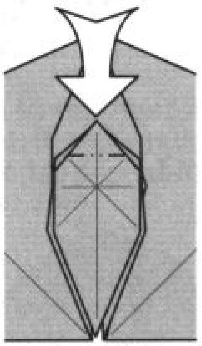
Sink the corners on the
creases you just made.

24



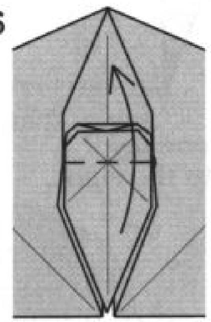
Sink the next pair of
corners to the same depth.

25



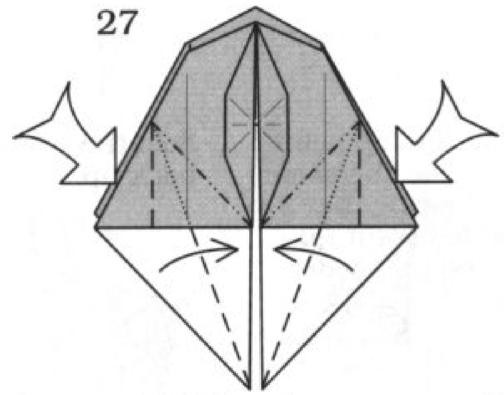
Sink the top
corner.

26



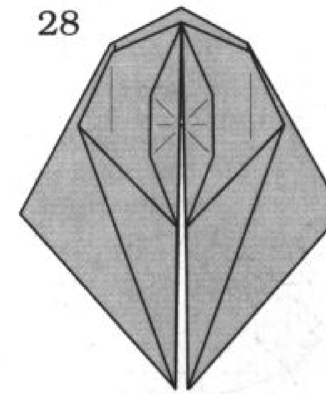
Fold the
point up.

27



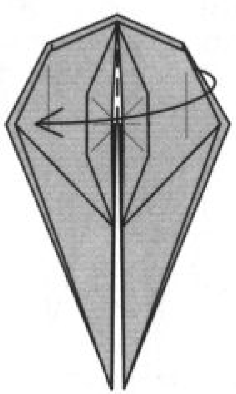
Reverse-fold the edges.

28



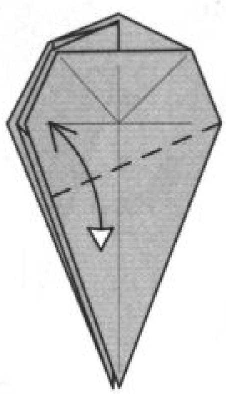
Repeat steps 17–27 behind.

29



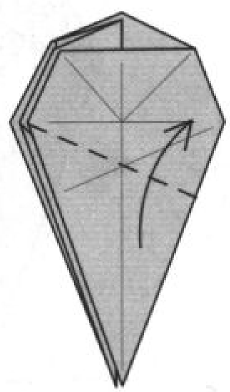
Fold one
layer over.

30



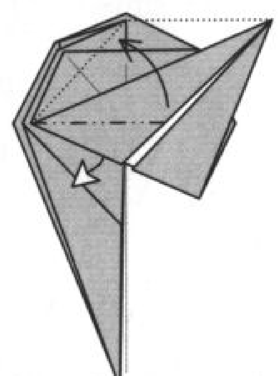
Fold and
unfold.

31



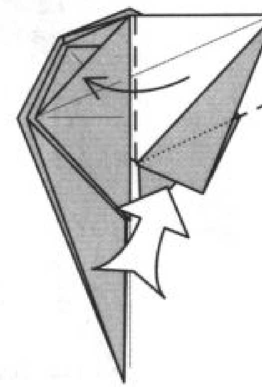
Fold upward.

32



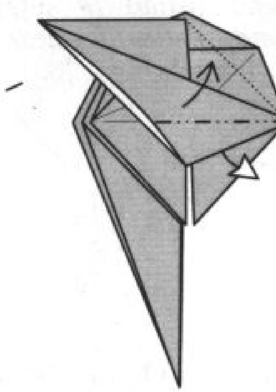
Pull out the
loose paper.

33



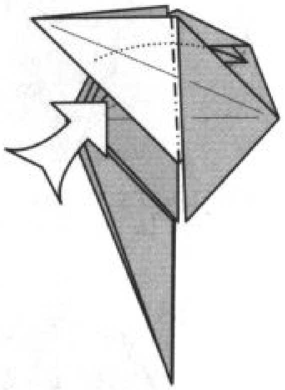
Squash-fold.

34



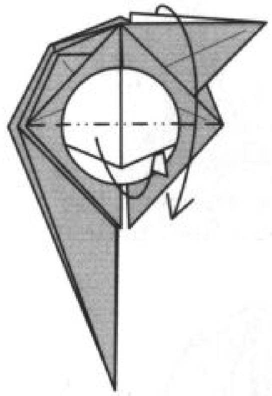
Pull out some
loose paper.

35



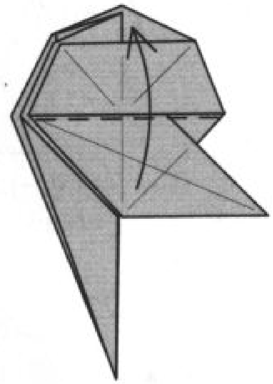
Reverse-fold the point over to the right.

36



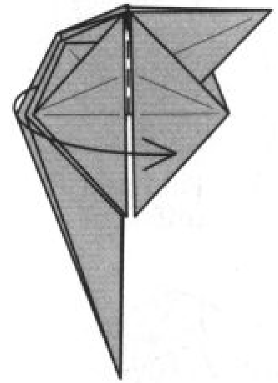
Fold the top point down; at the same time swing the hidden point up inside the model.

37



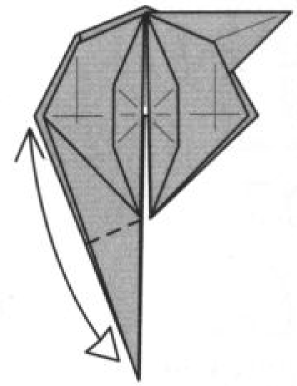
Fold the point back up.

38



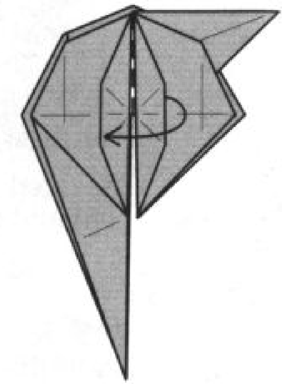
Fold one layer over to the right.

39



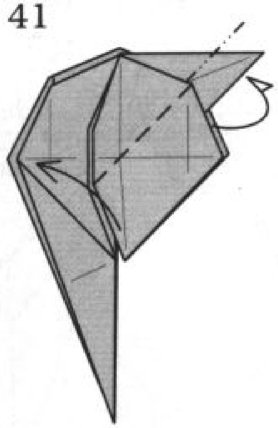
Fold and unfold.

40



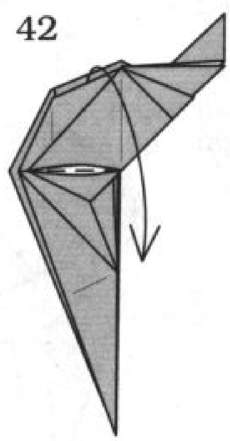
Fold one layer over to the left.

41



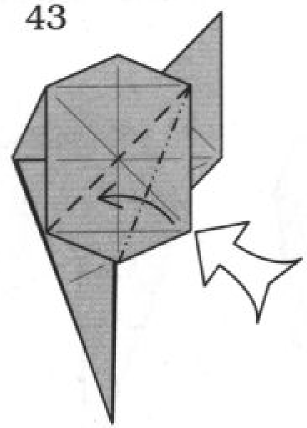
Fold one layer up to the left; repeat behind.

42



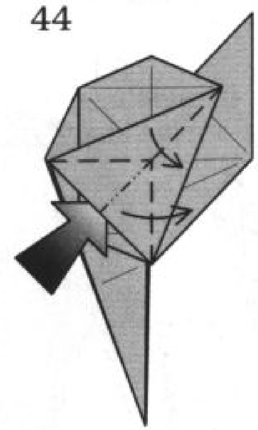
Fold the top down and flatten it.

43



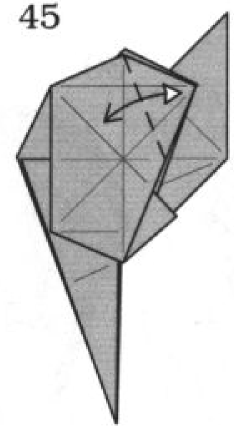
Spread-sink the indicated point.

44



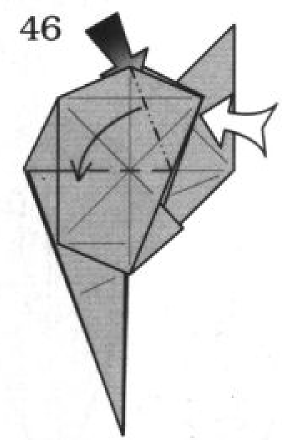
Close the sink up, incorporating the reverse fold at the bottom.

45



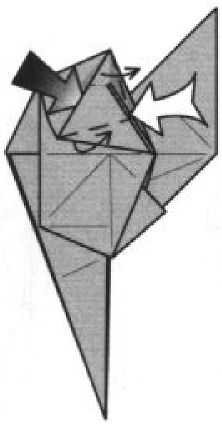
Fold and unfold.

46



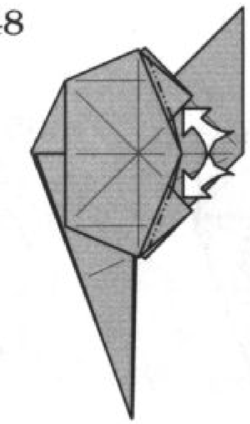
Open out the upper edges of the point to form a three-sided pyramid.

47



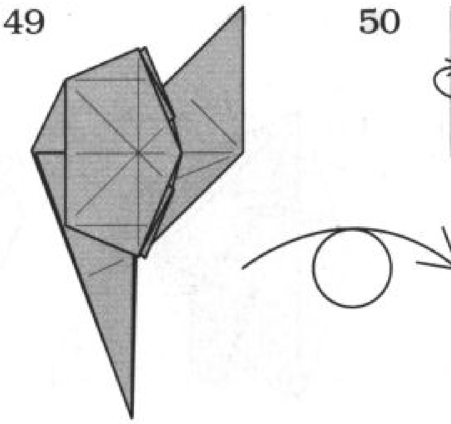
Push in the right side of the pyramid while reverse-folding its upper edge to the right.

48



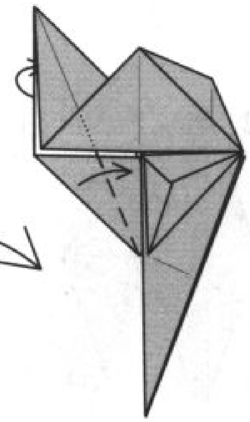
Reverse-fold both edges.

49



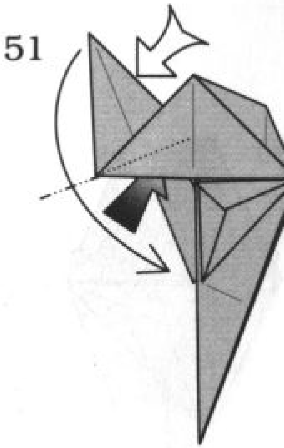
Like this. Turn the paper over.

50



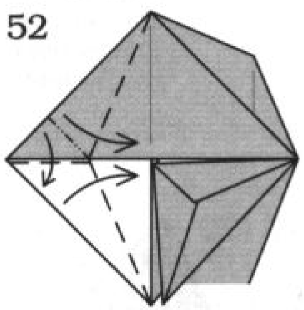
Valley-fold one layer.

51



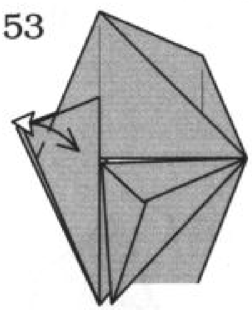
Reverse-fold the top corner down.

52



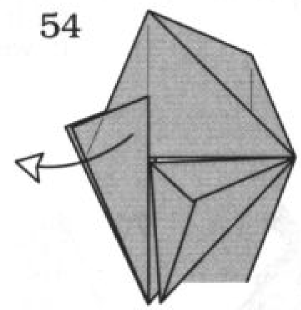
Fold a rabbit ear.

53



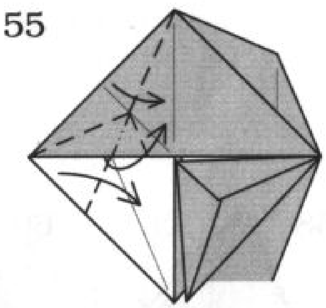
Fold and unfold.

54



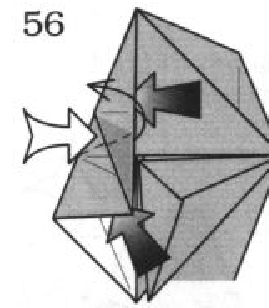
Unfold the rabbit ear.

55



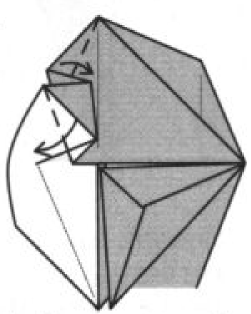
Fold a different kind of rabbit ear.

56



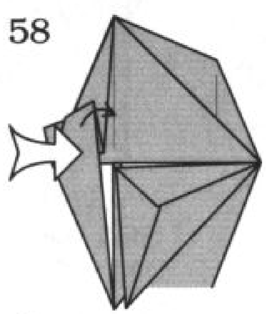
Pull the upper edge to the left and sink the lower edge.

57



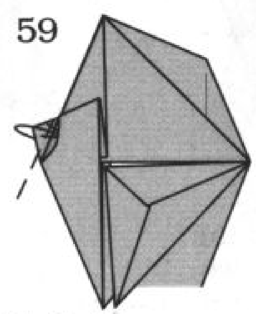
Tuck the two-toned corner into the pocket and flatten.

58



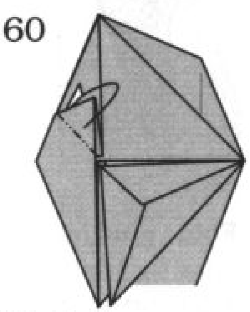
In progress.

59



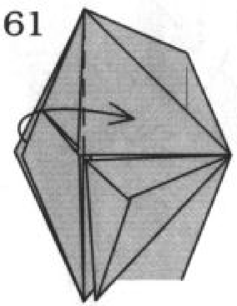
Tuck the corner into the pocket.

60



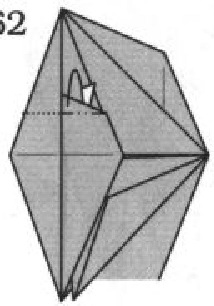
Tuck the corner into the pocket.

61



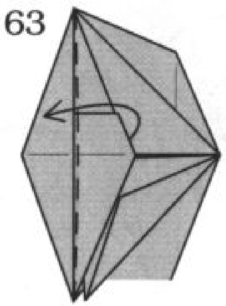
Fold one corner to the right.

62



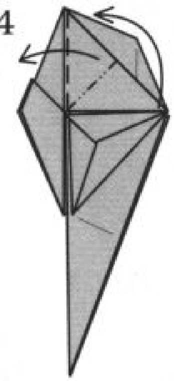
Mountain-fold the corner.

63



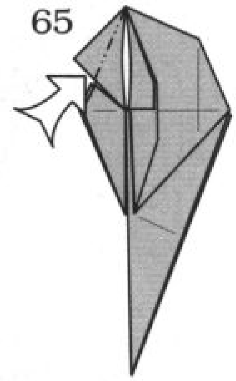
Fold the layer back to the left.

64



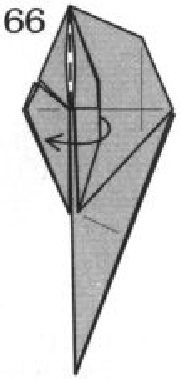
Swivel the right point upward.

65



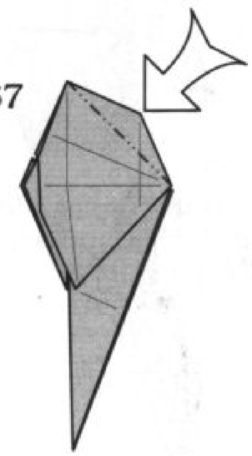
Reverse-fold the edge.

66



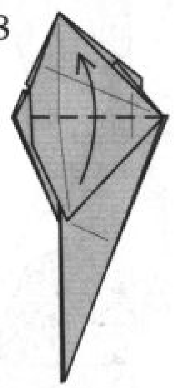
Fold all of the narrow layers over to the left.

67



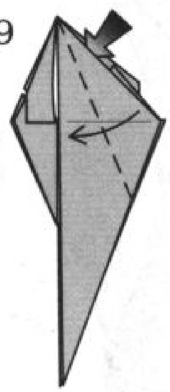
Sink the corner.

68



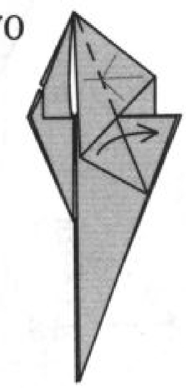
Fold upward.

69



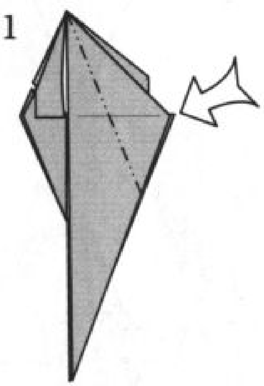
Open flat the sunk corner.

70



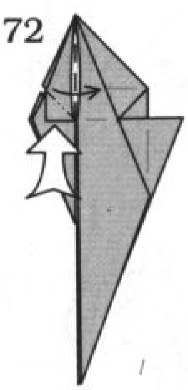
Close it back up.

71



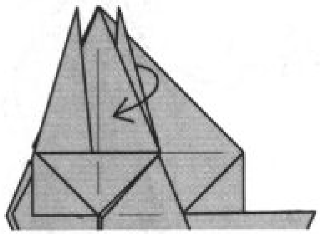
Sink the corner.

72



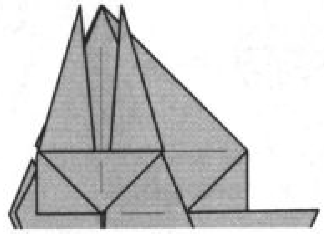
Squash-fold the corner asymmetrically, with three layers going to the right and one to the left.

73



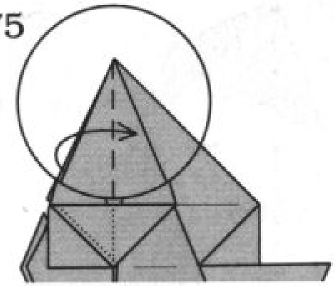
Lift the right point up to release it.

74



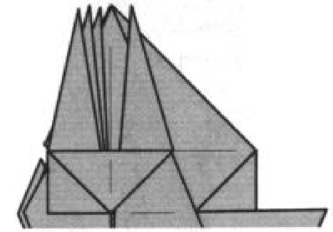
Like this.

75



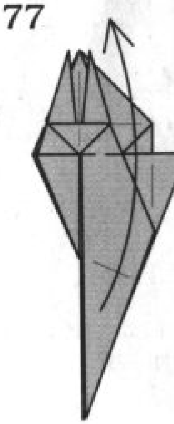
Behind the two points, fold one layer over to the right, releasing two more points.

76



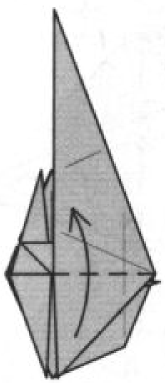
Like this.

77



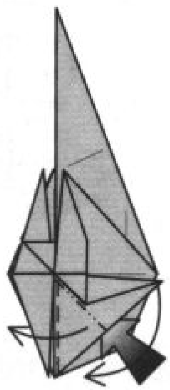
Fold the long point upward.

78



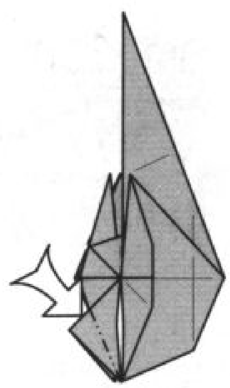
Fold one layer upward.

79



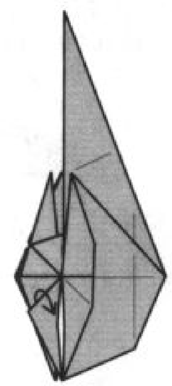
Swivel the right point downward.

80



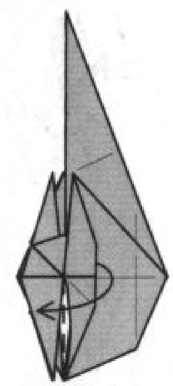
Reverse-fold the edge.

81



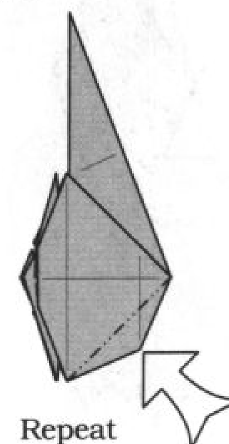
Bring the hidden point to the front.

82



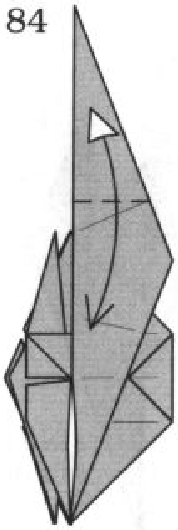
Fold all narrow layers over to the left.

83



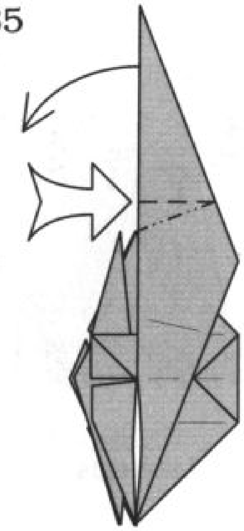
Repeat steps 67–71 on the bottom.

84



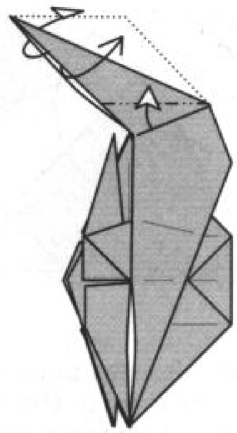
Fold and unfold.

85



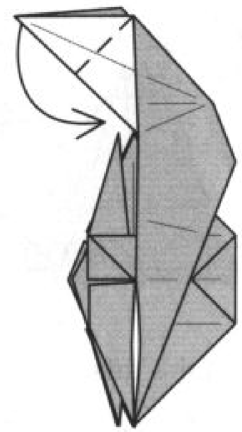
Crimp the point over to the left.

86



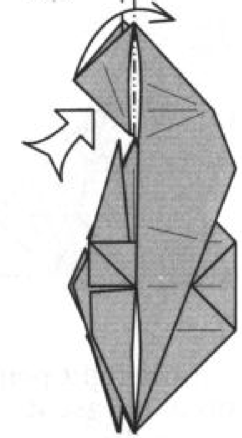
Pull out some loose paper; repeat behind.

87



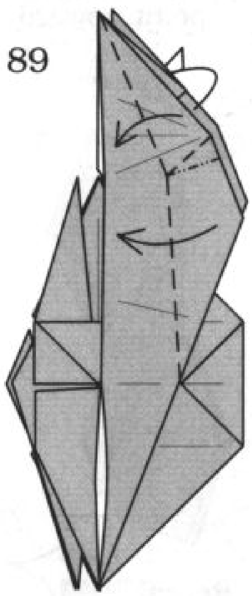
Reverse-fold the corner.

88



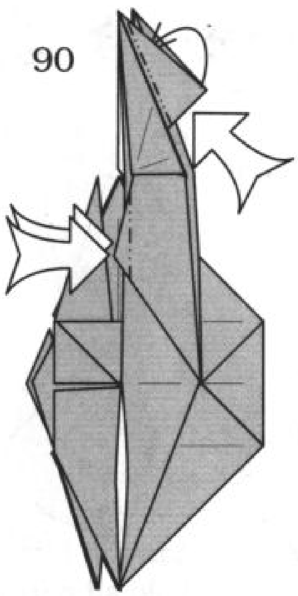
Reverse-fold the corner.

89



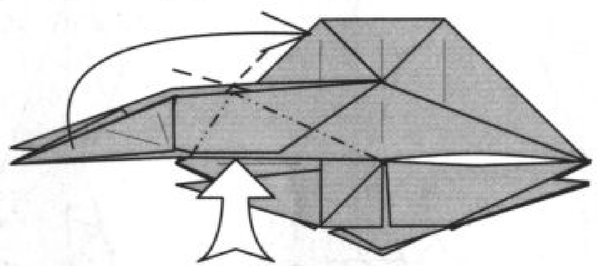
Narrow the long point with a rabbit ear on both sides.

90



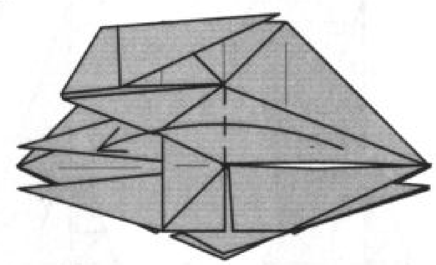
Sink the two lower corners that protrude beyond the left edge. Reverse-fold the edge at the top.

91



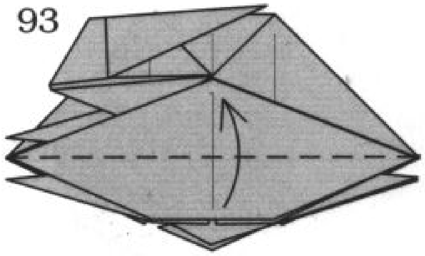
Simultaneously make two reverse folds.

92



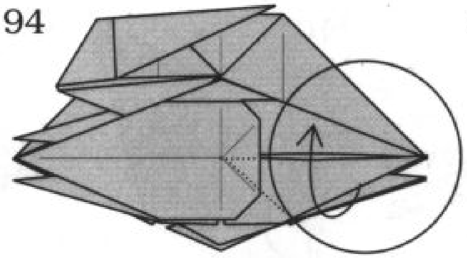
Fold one point over from right to left.

93



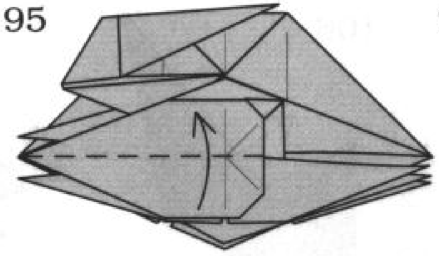
Fold one layer up.

94



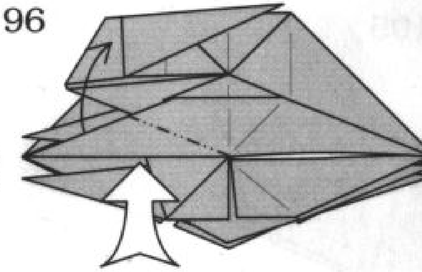
Fold one layer up behind the point.

95



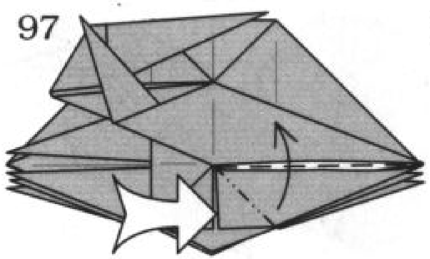
Fold one layer up.

96



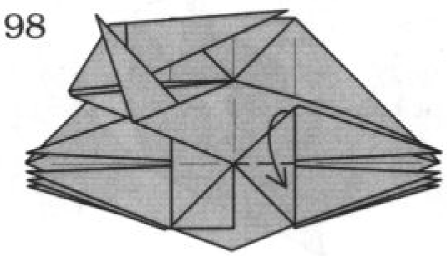
Reverse-fold the point upward to match the larger one.

97



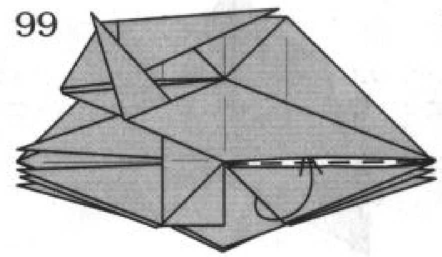
Squash-fold the corner symmetrically.

98



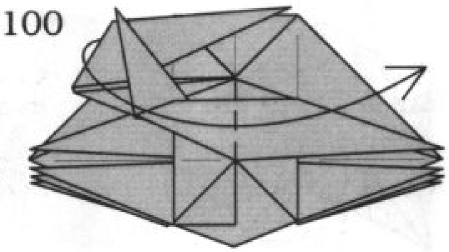
Fold one layer downward.

99



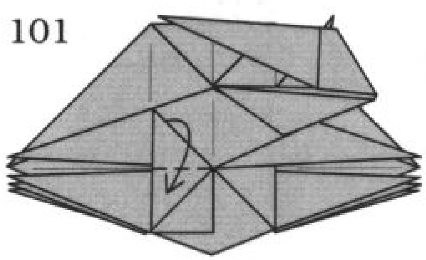
Tuck the layer underneath the raw edge.

100



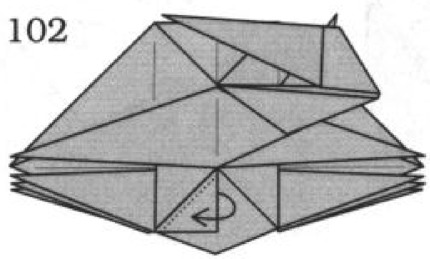
Swing two points over to the right.

101



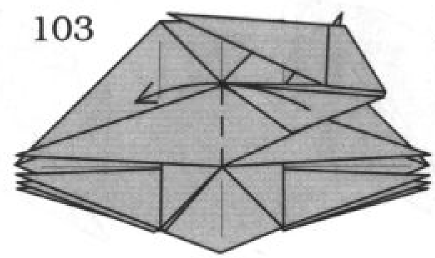
Repeat steps 98–99 on this flap.

102



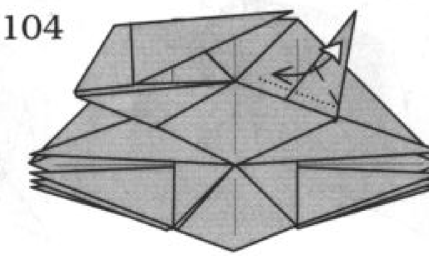
Tuck the corner into the pocket behind it.

103



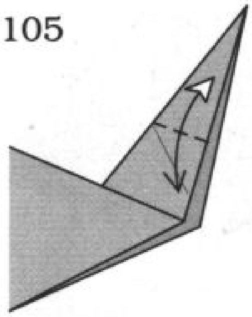
Fold the large point over to the left.

104



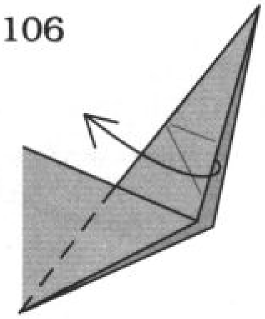
Fold the right edge of the point down to the dotted line and unfold.

105



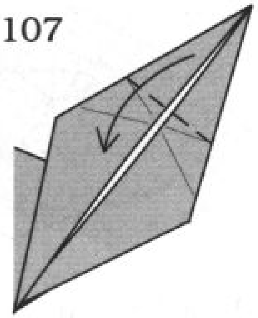
Fold and unfold.

106



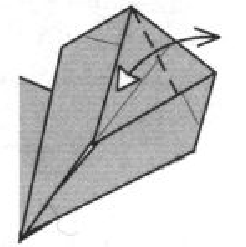
Open the flap.

107



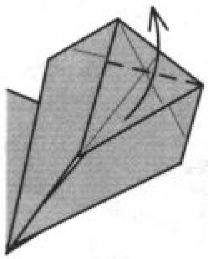
Fold the tip down.

108



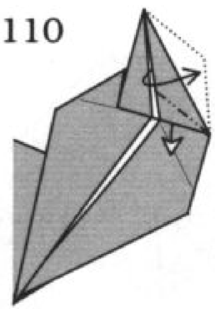
Fold and unfold.

109



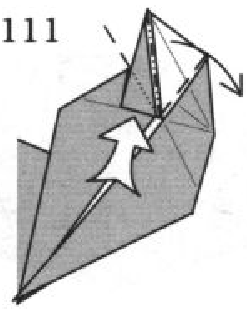
Fold the point upward so that its left edge is aligned with the layer behind it.

110



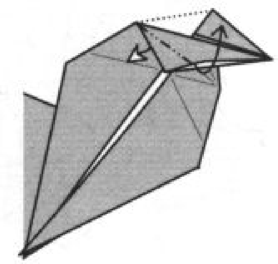
Pull out the loose paper.

111



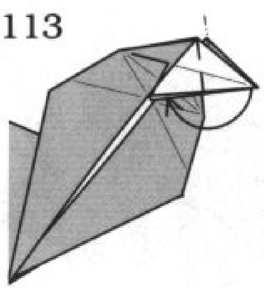
Squash-fold.

112



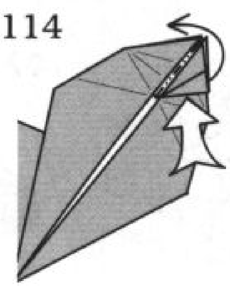
Pull out the loose paper.

113



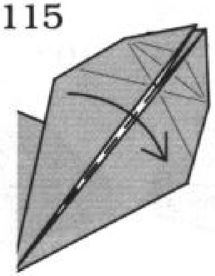
Reverse-fold.

114



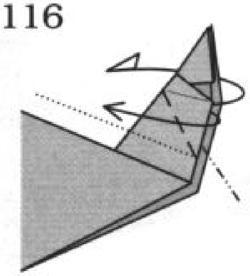
Reverse-fold.

115



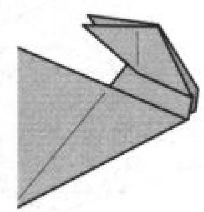
Close the flap up.

116



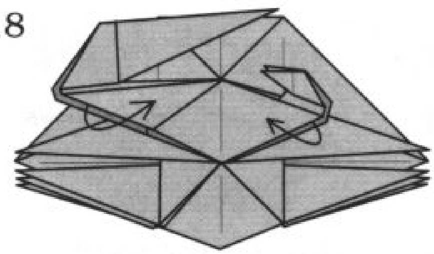
Outside-reverse-fold on the creases you made in step 104.

117



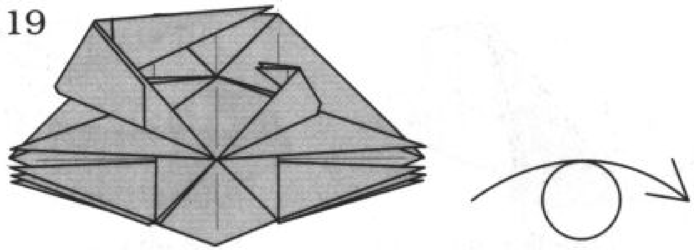
Like this.

118



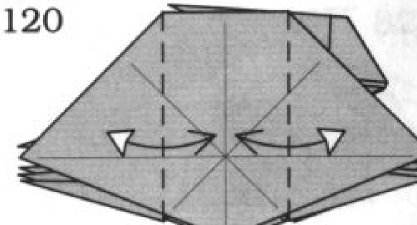
Tuck the "elbows" of the claws into the pockets beneath them (similar to steps 98–99).

119



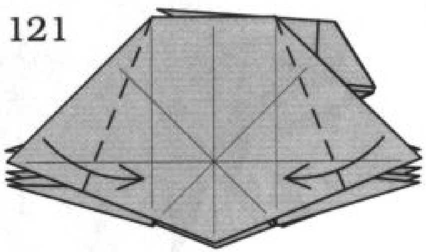
Like this. Turn the model over.

120



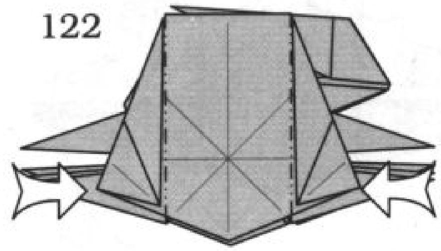
Fold and unfold.

121



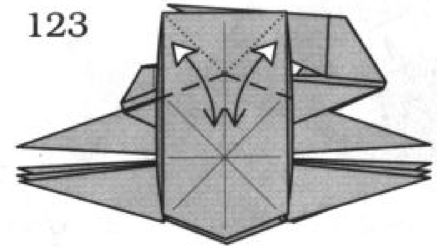
Fold the upper edges in to the creases you just made.

122



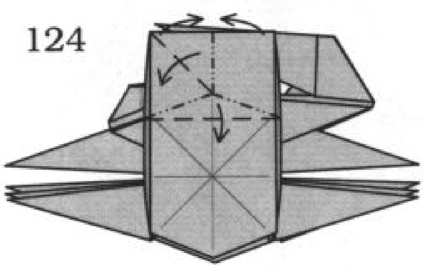
Carefully closed-sink the corners into the body.

123



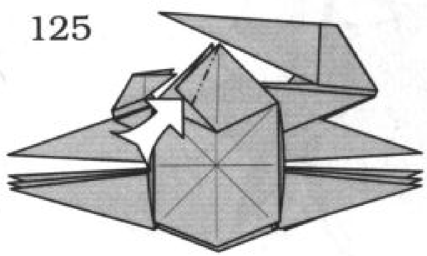
Fold and unfold.

124



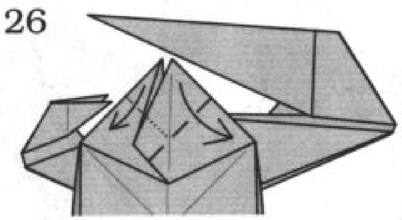
Crimp the body and swing the two points toward each other.

125



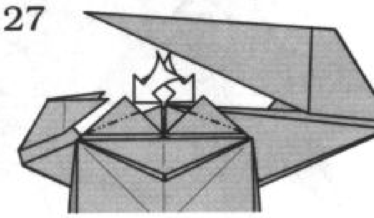
Reverse-fold the edge.

126



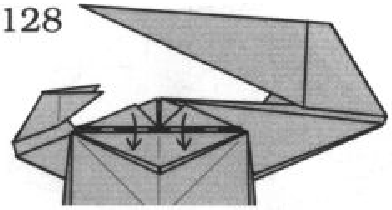
Spread the two points at the top out to the sides.

127



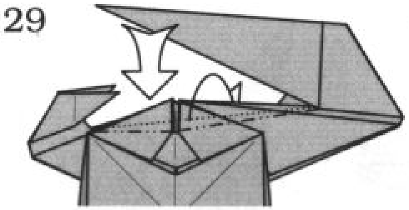
Reverse-fold the edges.

128



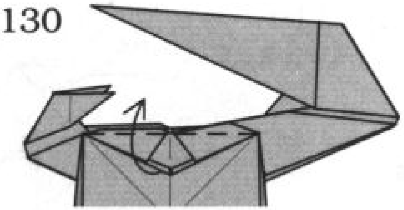
Fold the two thick edges downward.

129



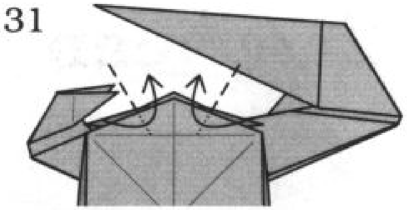
Reverse-fold the left side and mountain-fold the right side at the top of the body.

130



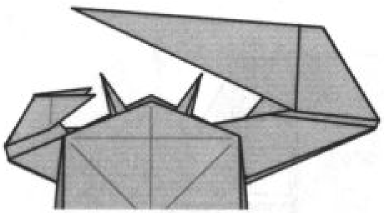
Fold all the layers upward.

131



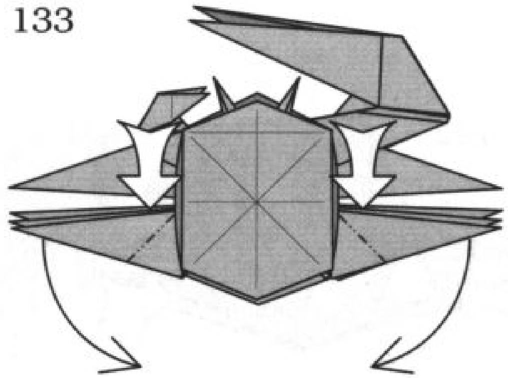
Twist the two trapped points forward so that they point up and out.

132



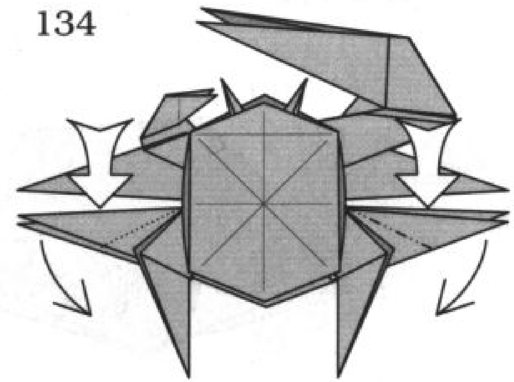
Like this.

133



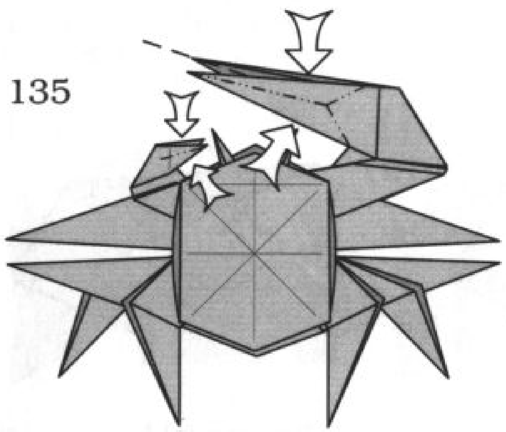
Reverse-fold the thick pair of points downward.

134



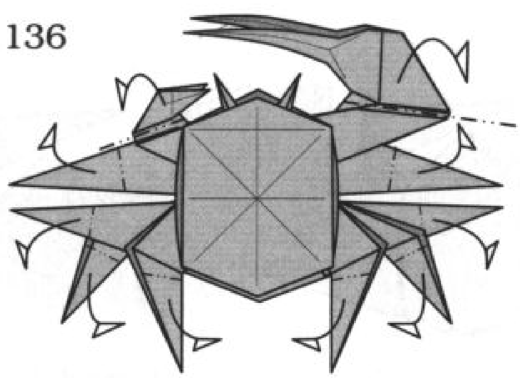
Reverse-fold the next pair of points downward (note that the left one is inside another point).

135



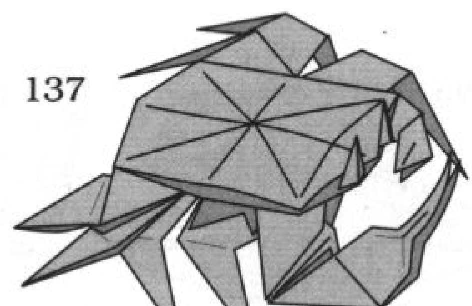
Pinch both pincers of each claw to shape them.

136



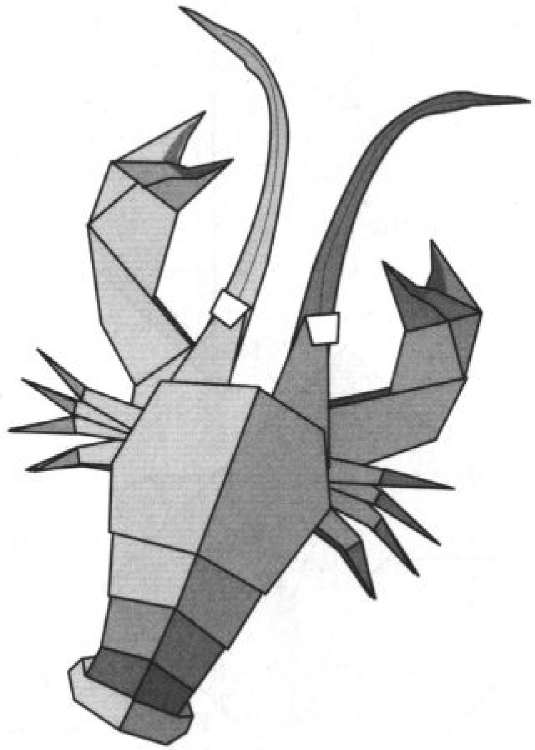
Mountain-fold all of the legs and claws downward and puff up the body to shape it.

137



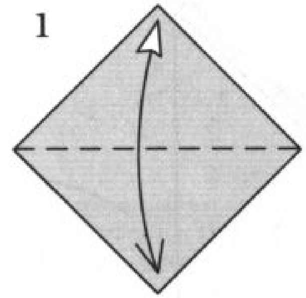
Fiddler Crab

American Lobster



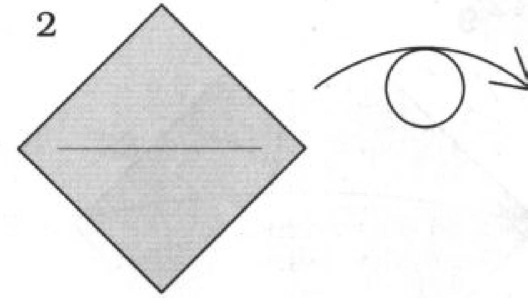
This dark green crustacean has large claws used for crushing and cutting its prey of mollusks and small fish. The lobster (*Homarus americanus*) grows to about two feet long and walks along the ocean floor. It is protected by a hard outer exoskeleton. To grow, it sheds its exoskeleton. While the new one is forming, the lobster hides in holes in the ocean floor.

1

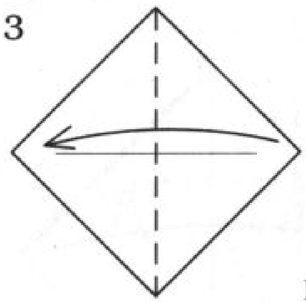


Fold and unfold.

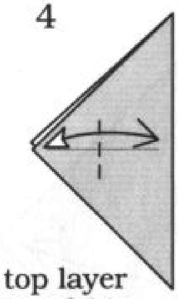
2



3

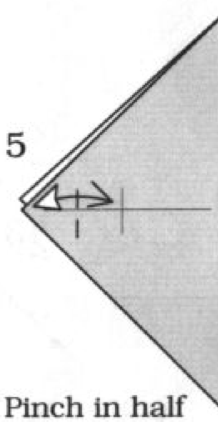


4



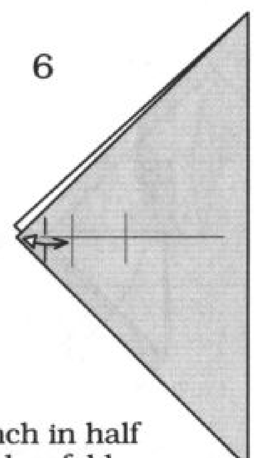
Pinch the top layer in half and unfold.

5



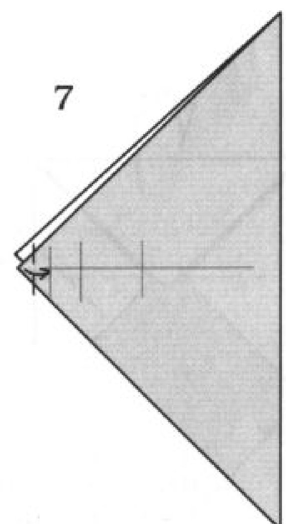
Pinch in half and unfold.

6

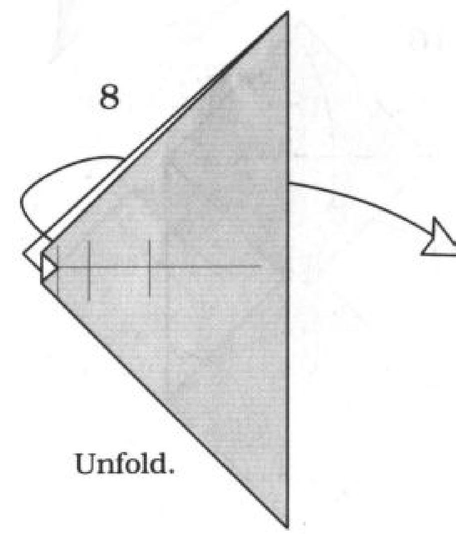


Pinch in half and unfold.

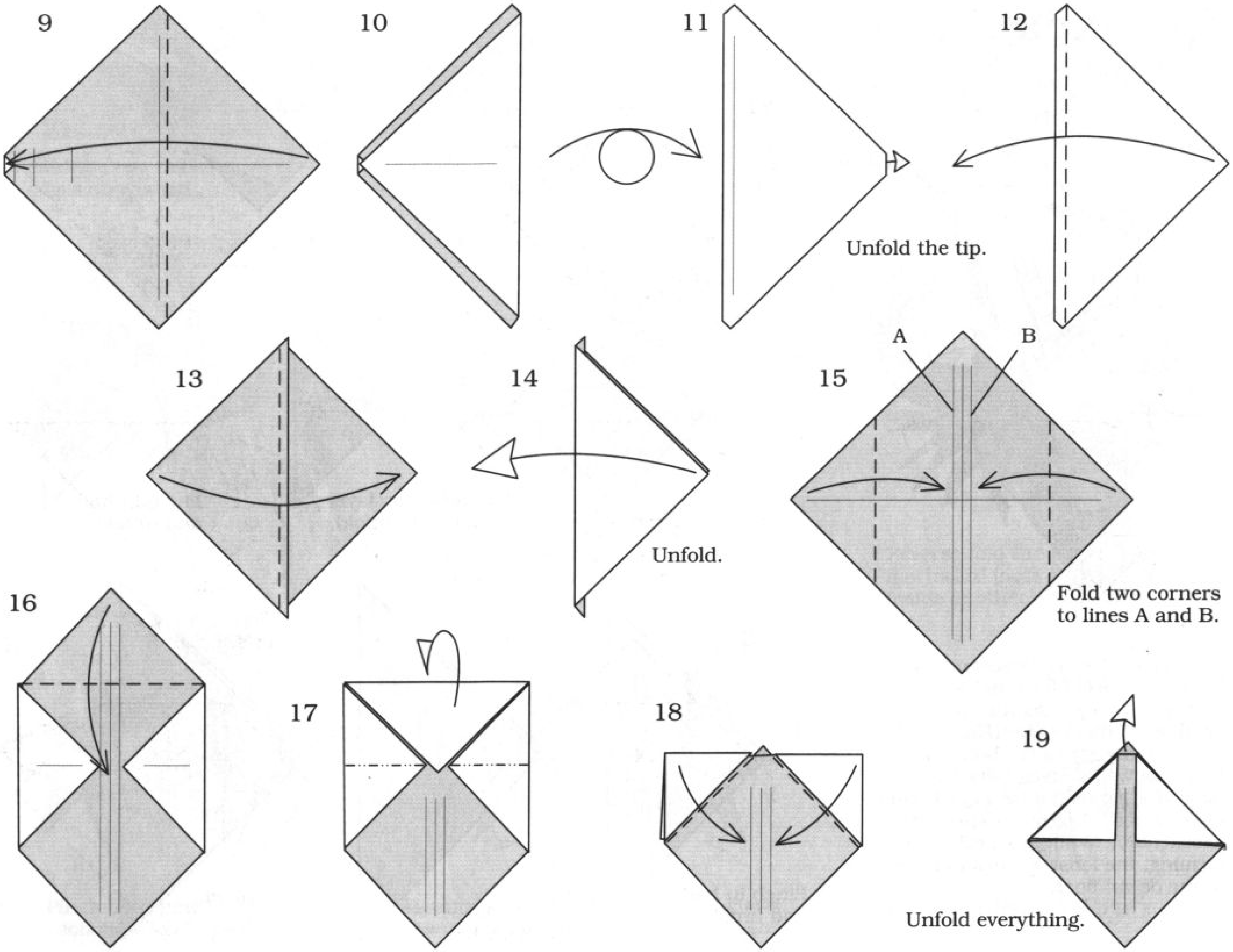
7



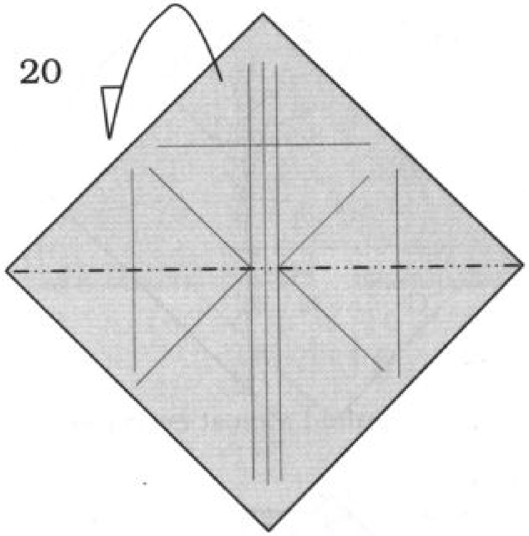
8



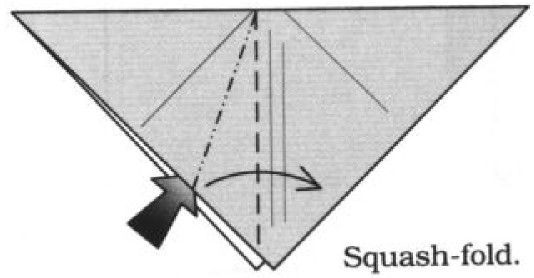
Unfold.


9
10
11
12
Unfold the tip.
13
14
Unfold.
15
A
B
Fold two corners
to lines A and B.
16
17
18
19
Unfold everything.

20

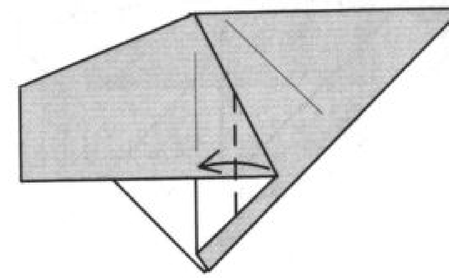


21

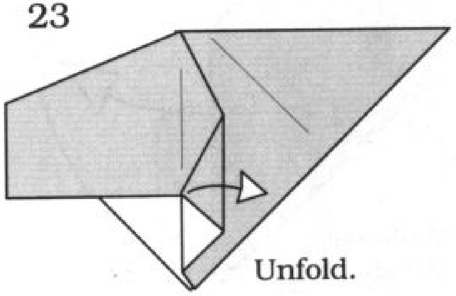


Squash-fold.

22

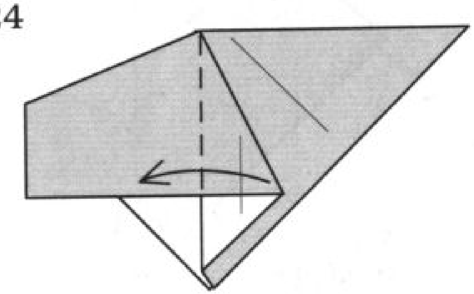


23

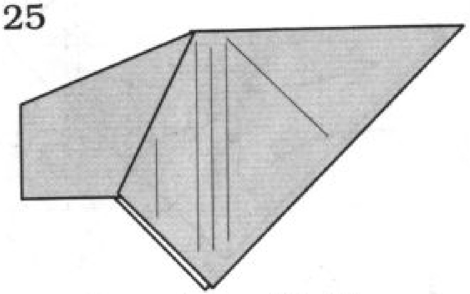


Unfold.

24

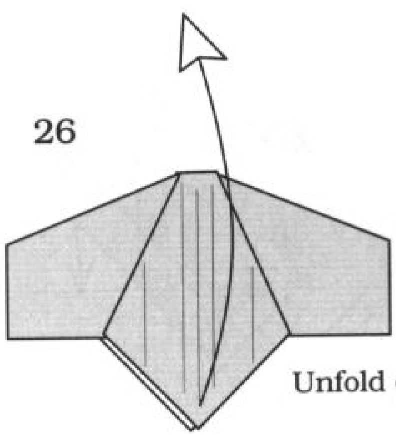


25



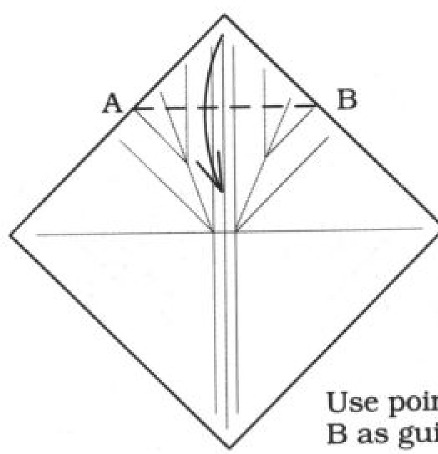
Repeat steps 21–24
on the right.

26



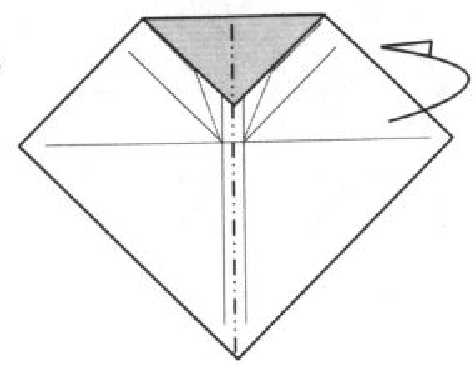
Unfold everything.

27

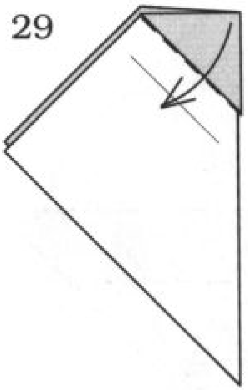


Use points A and
B as guides.

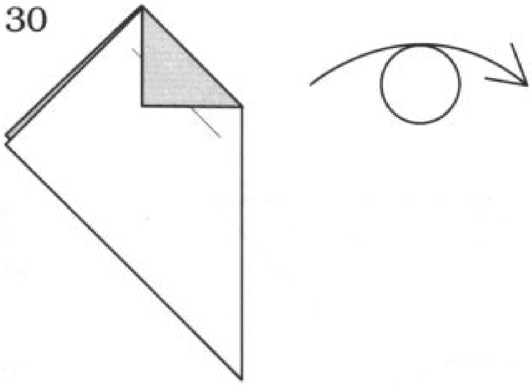
28



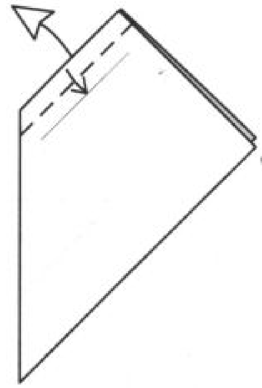
29



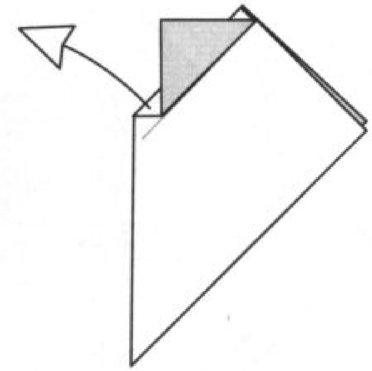
30



31

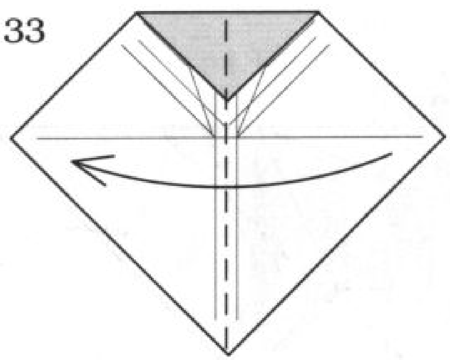


32

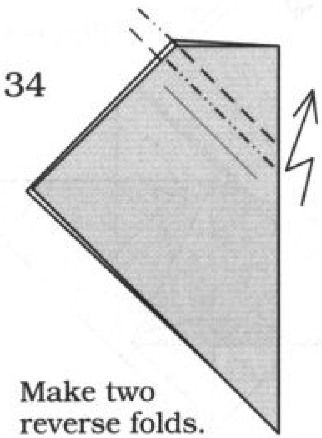


Unfold almost everything.

33

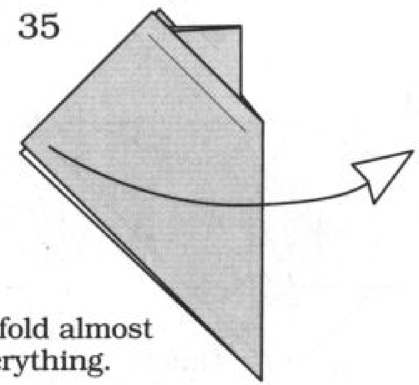


34



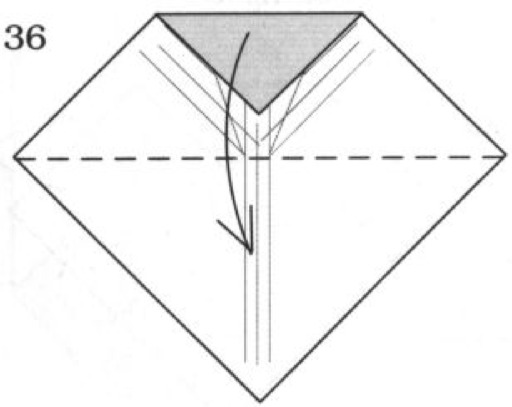
Make two reverse folds.

35

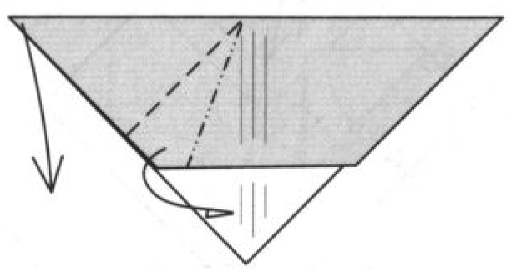


Unfold almost everything.

36

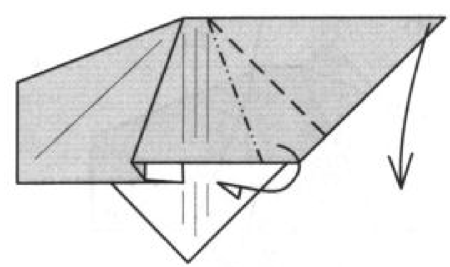


37

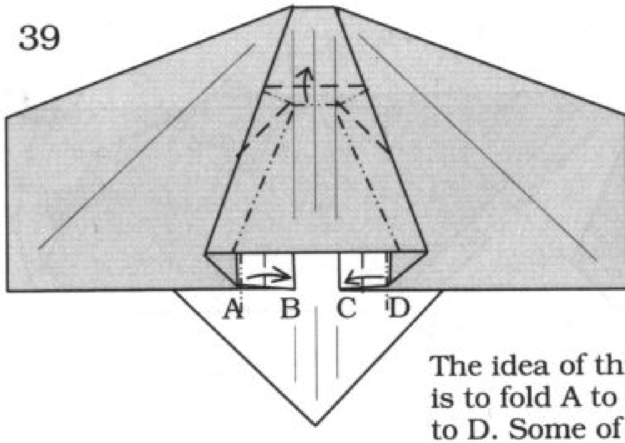


Fold on the existing creases.

38

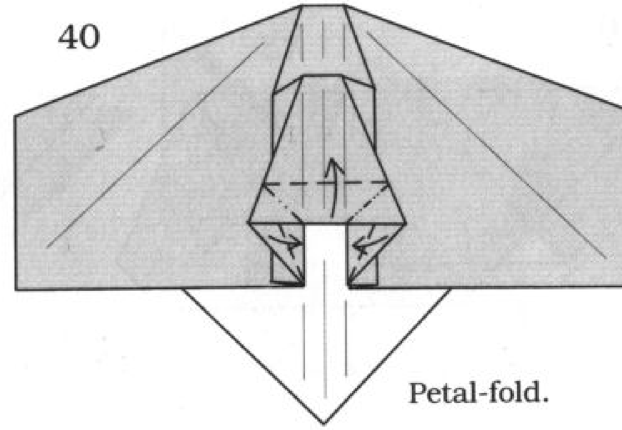


39



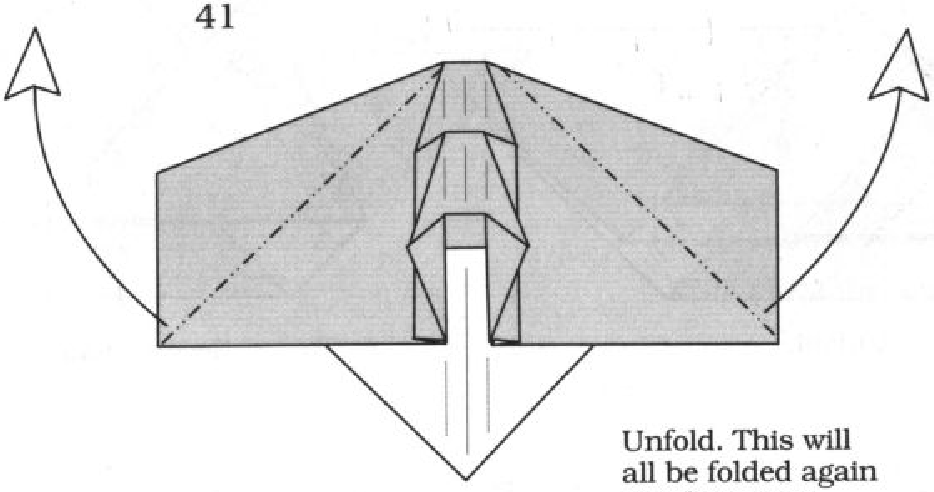
The idea of this step is to fold A to B and C to D. Some of the existing creases are used to do this step.

40



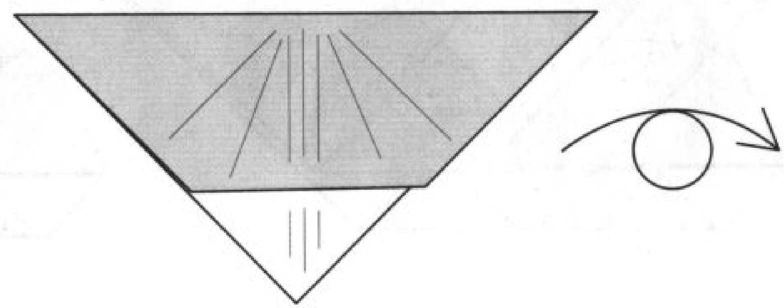
Petal-fold.

41

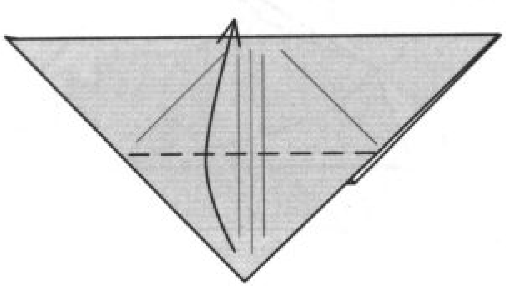


Unfold. This will all be folded again at a later step.

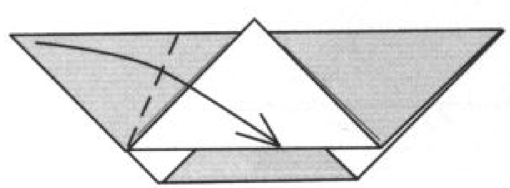
42



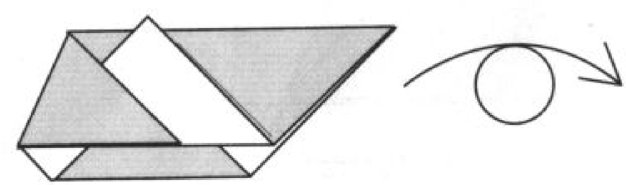
43



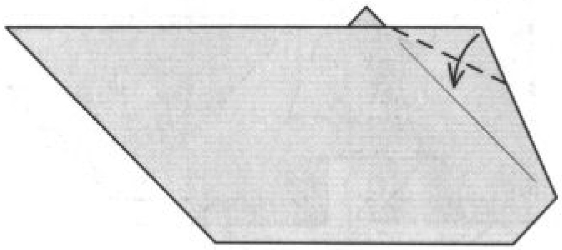
44



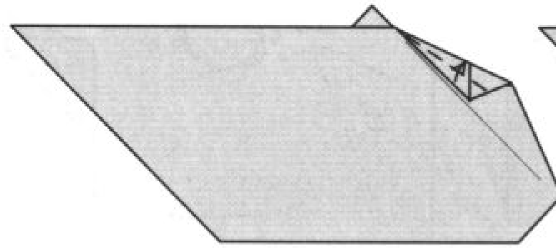
45



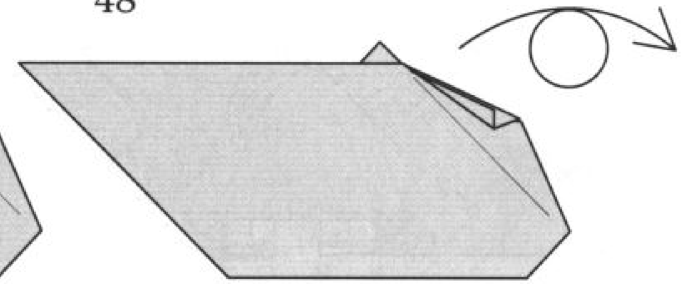
46



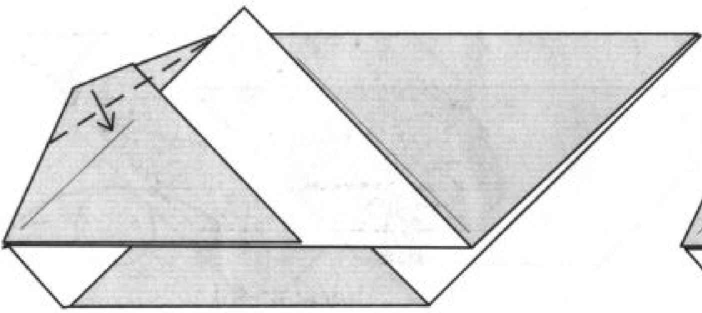
47



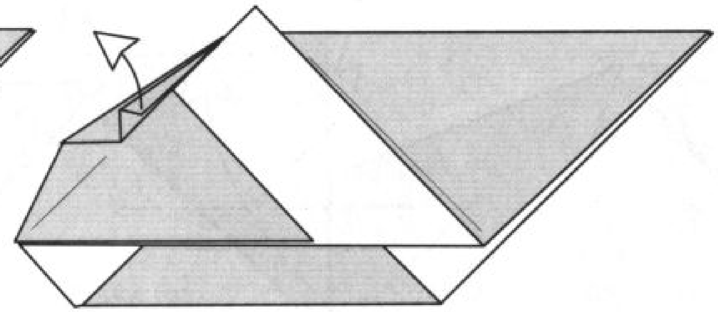
48



49

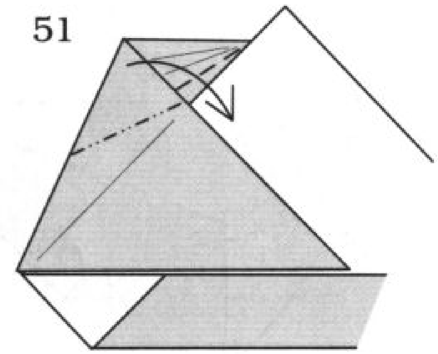


50



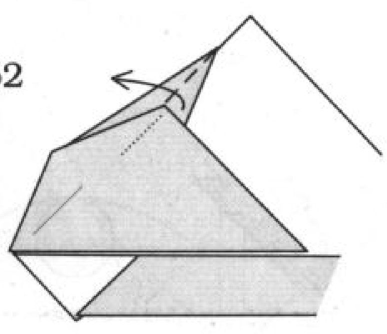
Unfold.

51



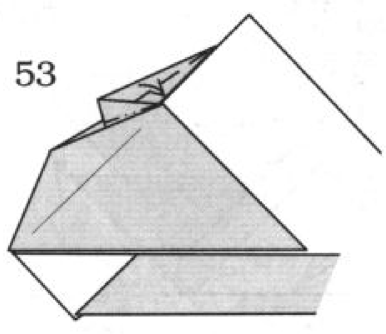
Reverse-fold.

52



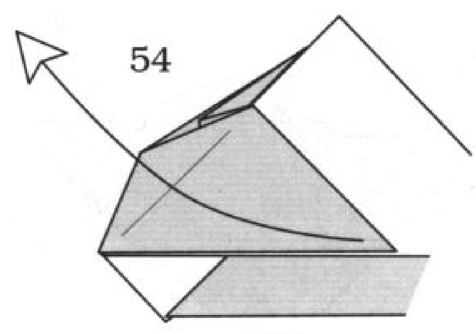
Reverse-fold.

53



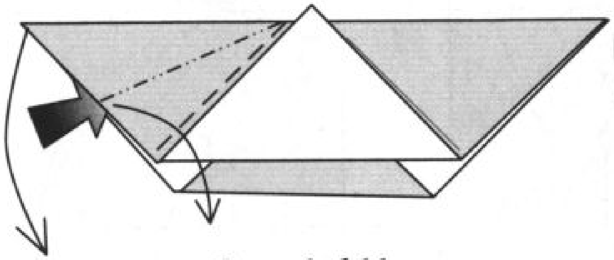
Reverse-fold.

54



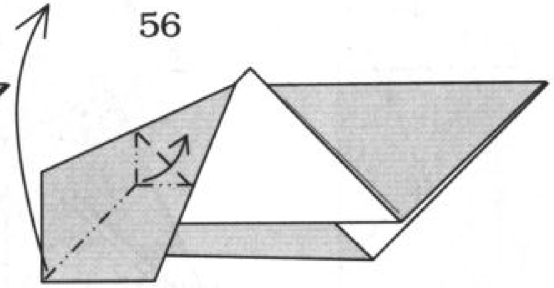
Unfold.

55

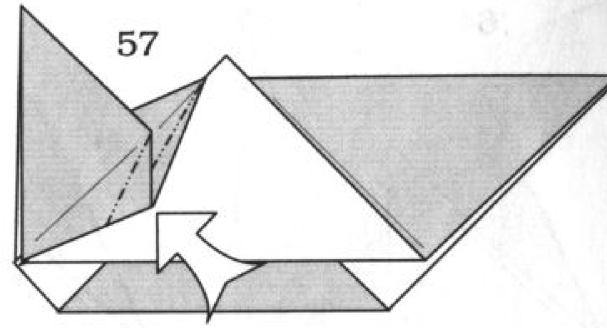


Squash-fold.

56

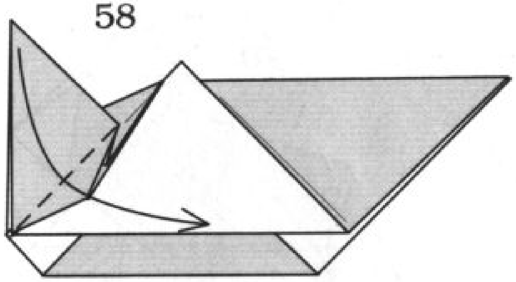


57

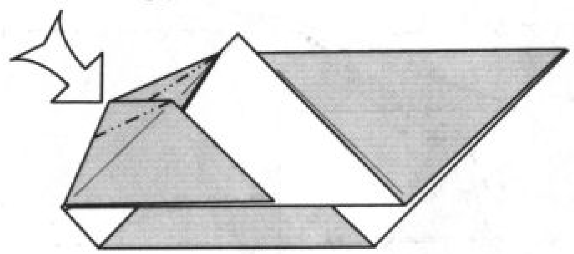


Sink along the creases.

58

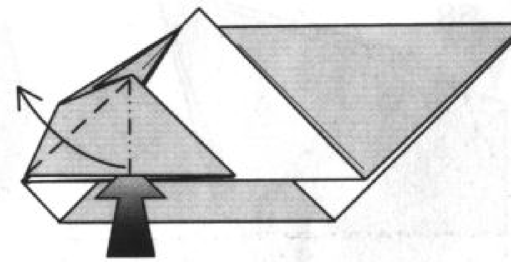


59



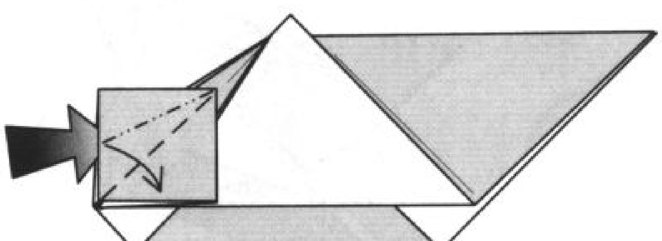
Sink along the creases.

60



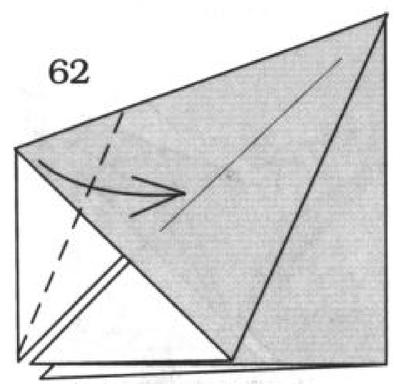
Squash-fold.

61



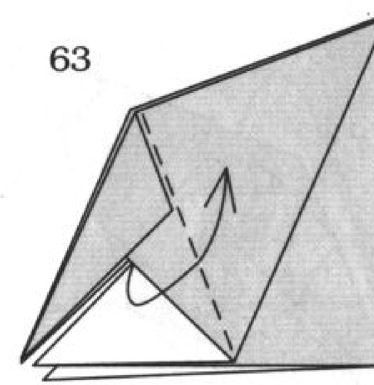
Squash-fold.

62

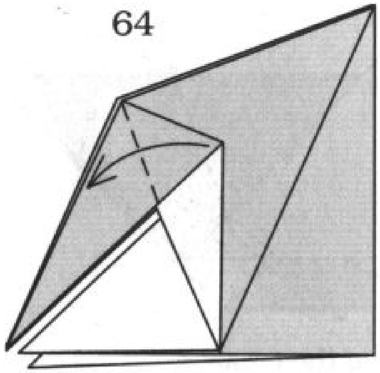


Only part of the
model is drawn.

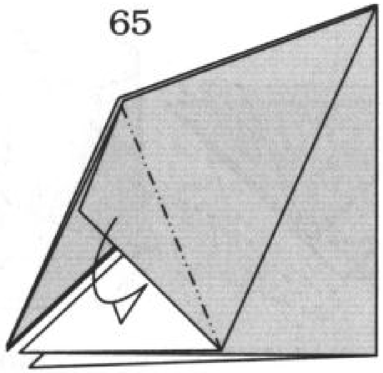
63



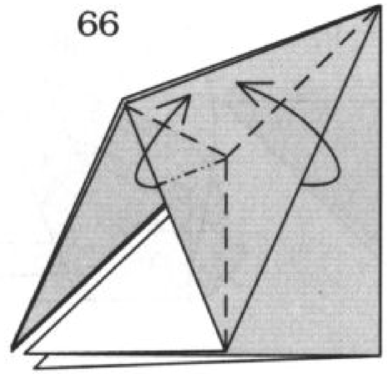
64



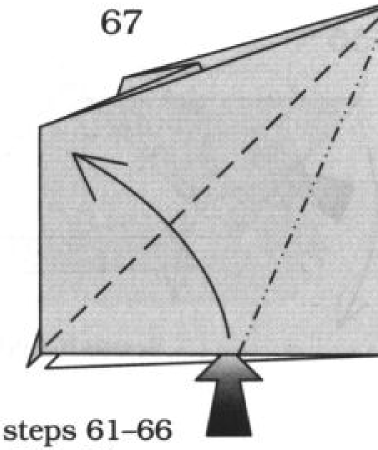
65



66

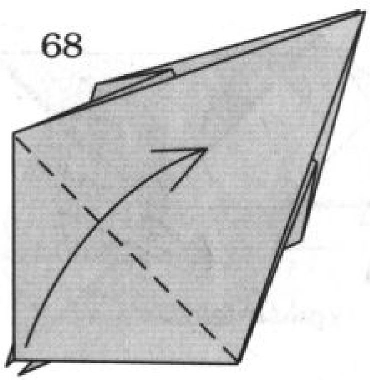


67

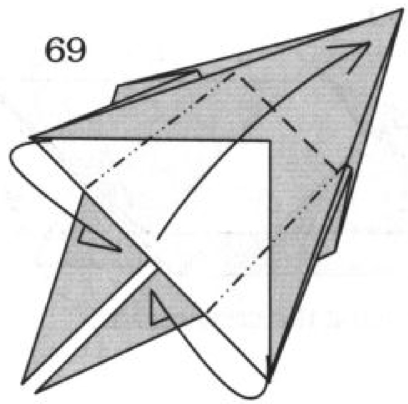


Repeat steps 61–66 on the right side.

68

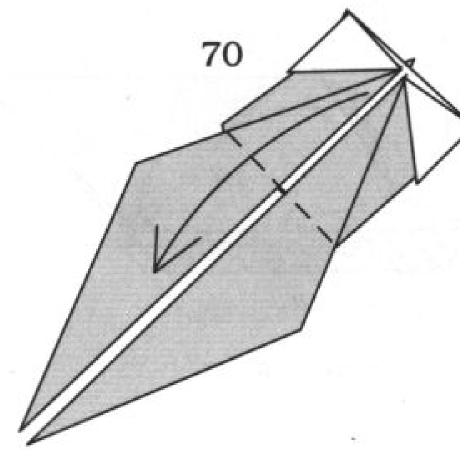


69

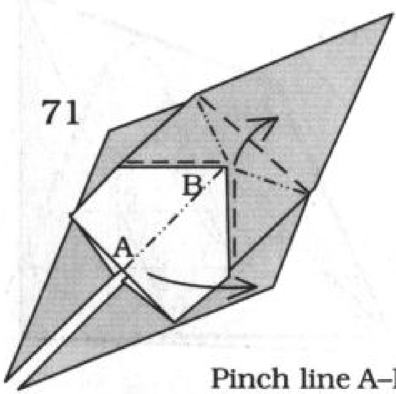


Petal-fold.

70

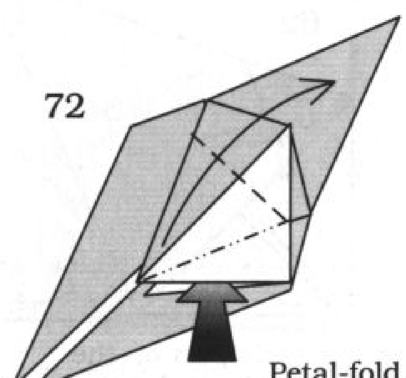


71



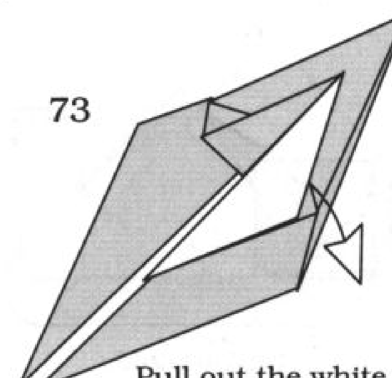
Pinch line A–B first.

72



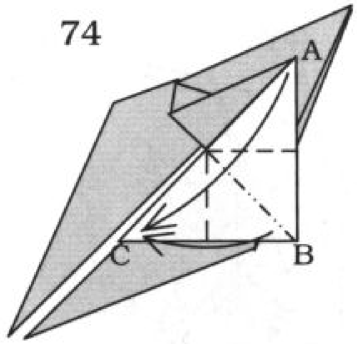
Petal-fold.

73



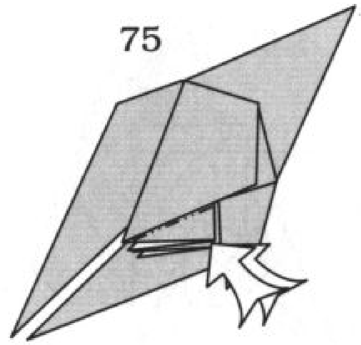
Pull out the white flap.

74



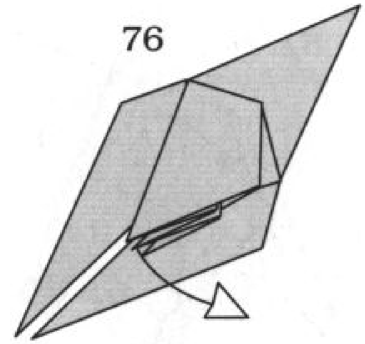
Fold corners
A and B to C.

75



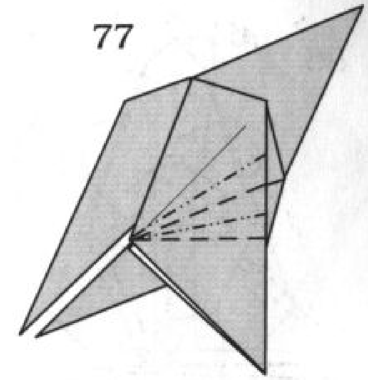
Two reverse folds.

76



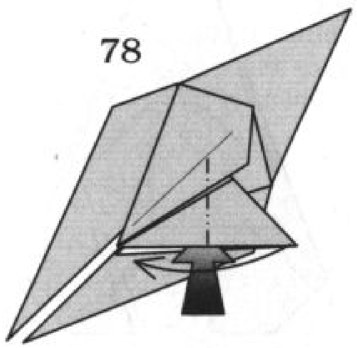
Pull the middle corner
all the way out.

77



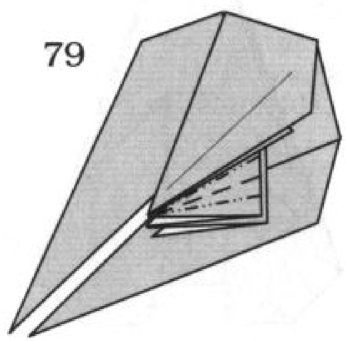
Four reverse folds.

78



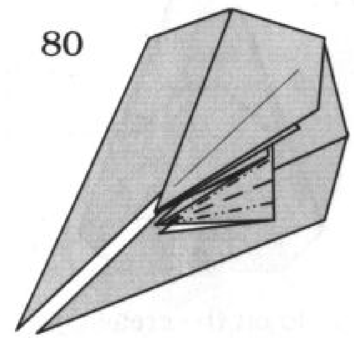
Reverse-fold.

79



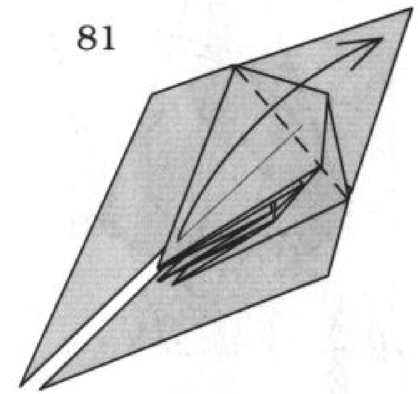
Three reverse folds.

80

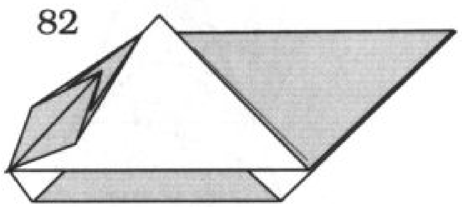


Three more reverse folds.

81

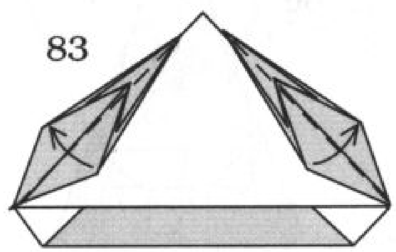


82

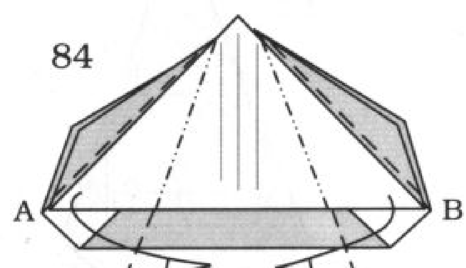


Repeat steps 44–81
on the right side.

83

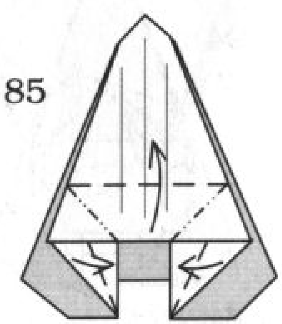


84



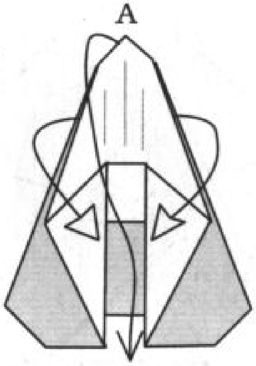
Fold corners A and B down.

85



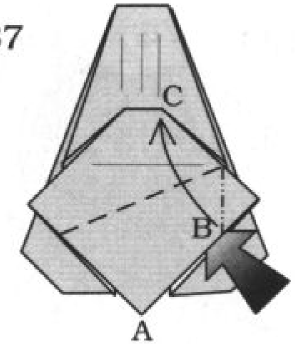
Petal-fold.

86



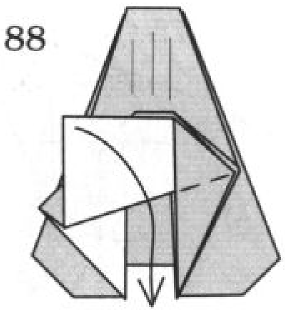
Pull out the white paper and fold corner A down.

87

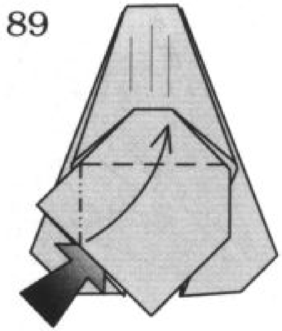


Squash-fold B up to corner C.

88

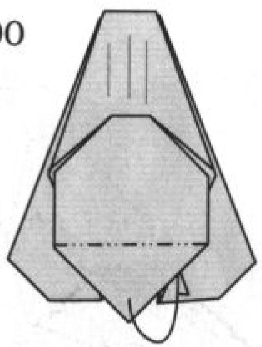


89

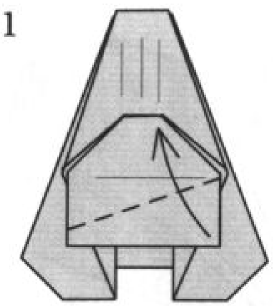


Repeat steps 87–88 on the left side.

90

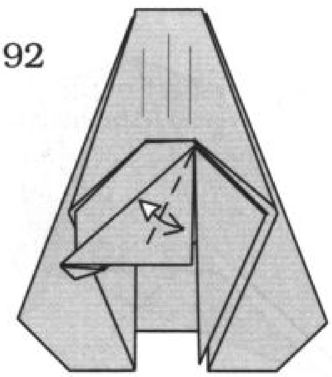


91



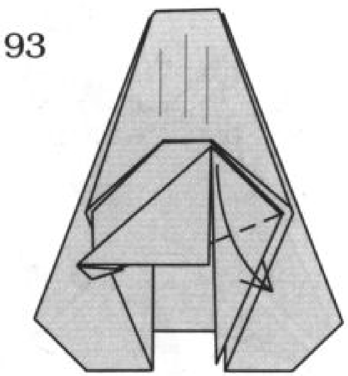
Fold on the crease.

92



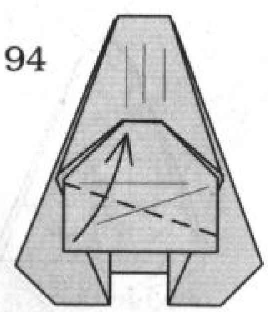
Kite-fold down and unfold. Note that two layers are folded together.

93



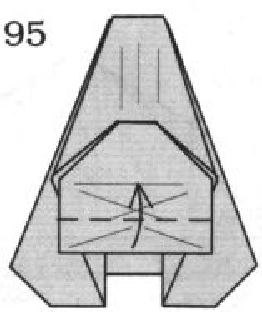
Fold back down.

94

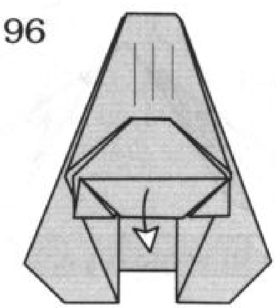


Repeat steps 91–93 on the left side.

95

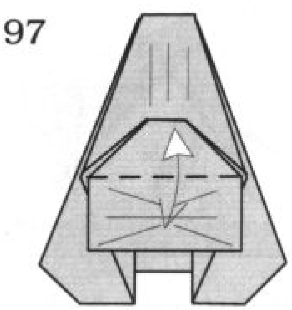


96



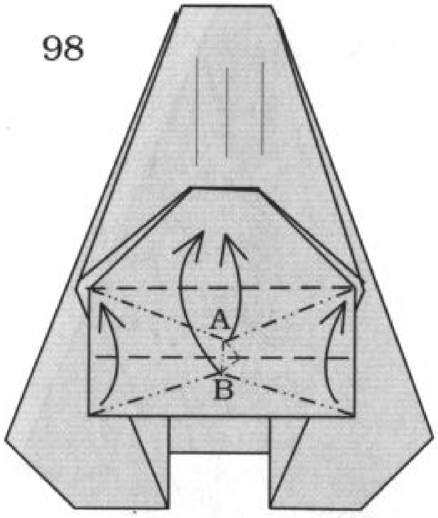
Unfold.

97



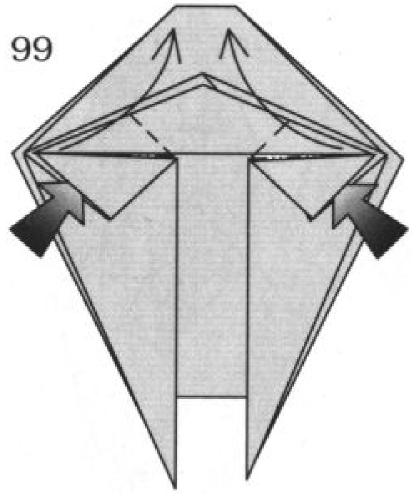
Fold down and unfold.

98



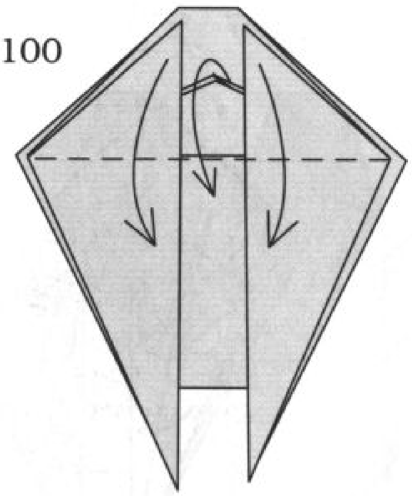
Fold A and B up and on top of each other using the existing creases.

99

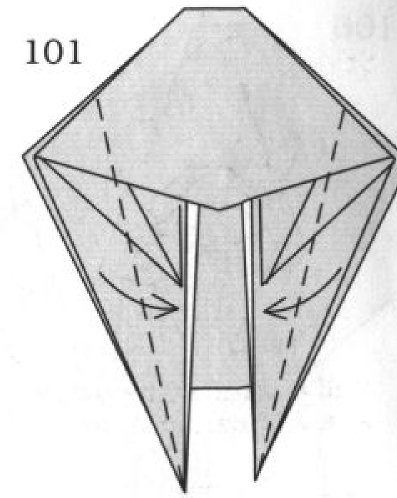


Only part of the model is drawn. Make two squash folds.

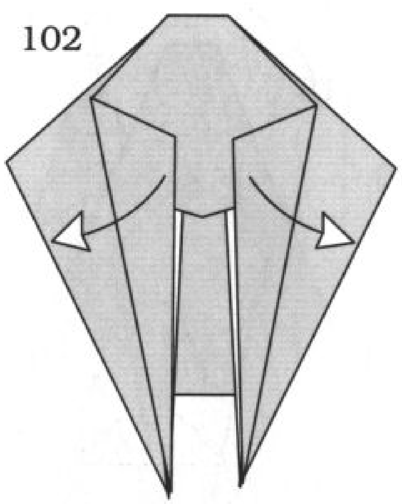
100



101

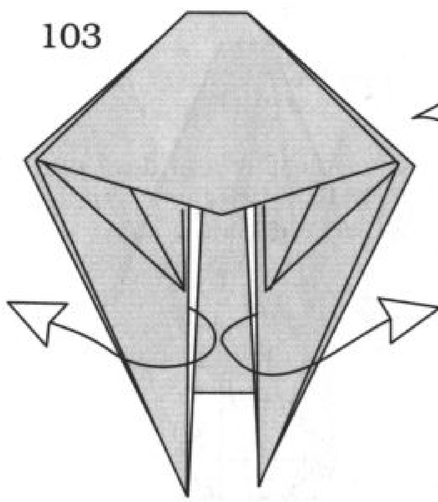


102



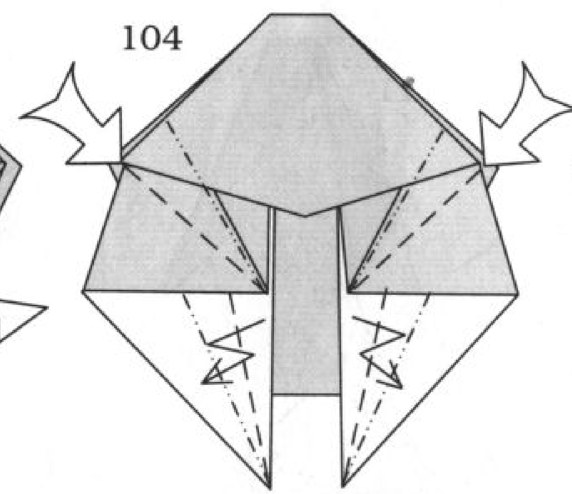
Unfold.

103



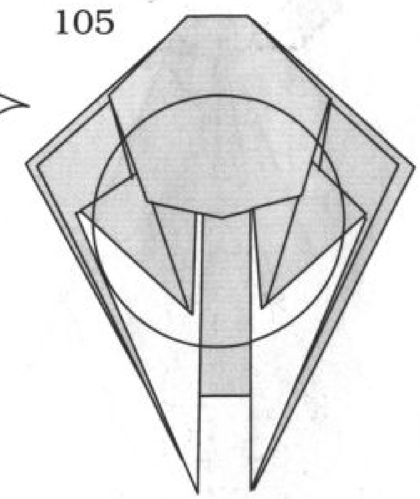
Pull out some paper.

104



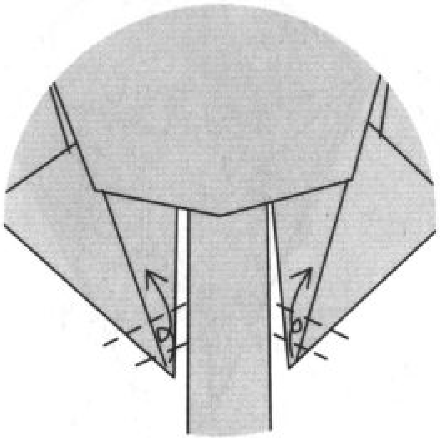
Make two reverse folds on each side.

105



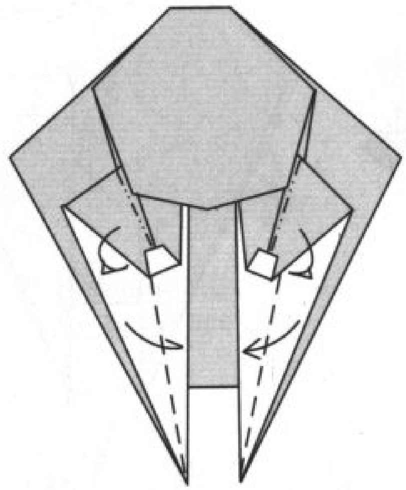
The part inside the circle will be enlarged in the next step.

106

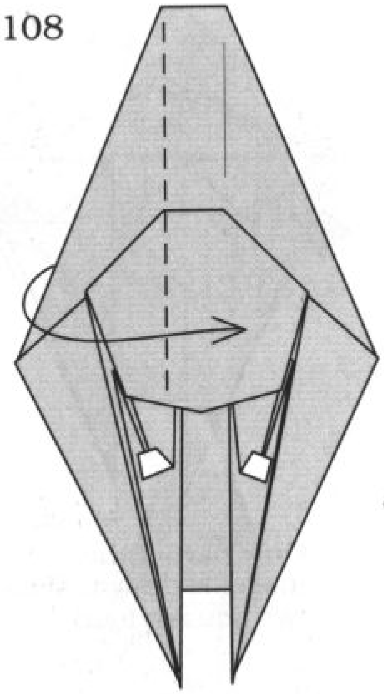


Make two simple valley folds to form each eye.

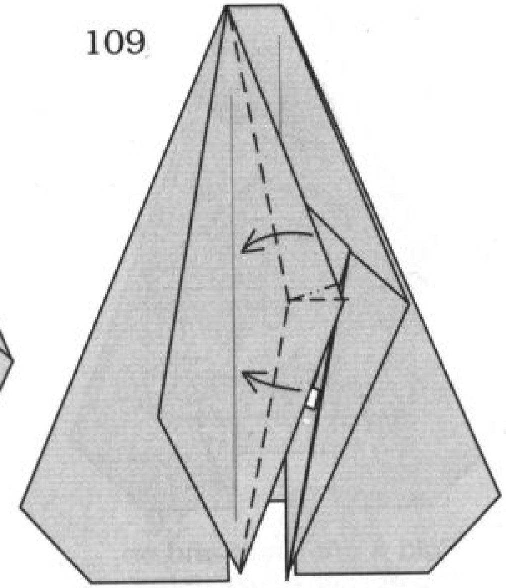
107



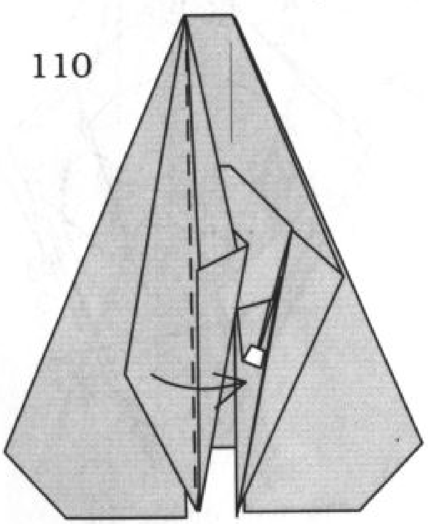
108



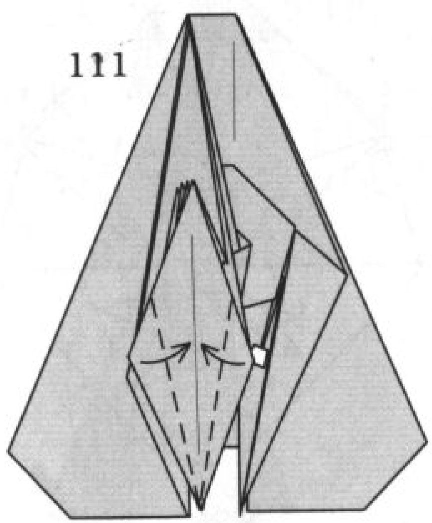
109



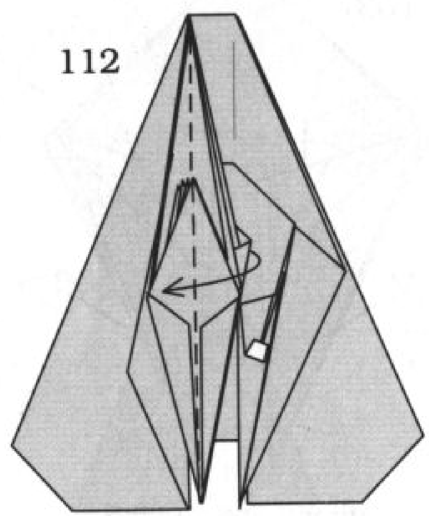
110



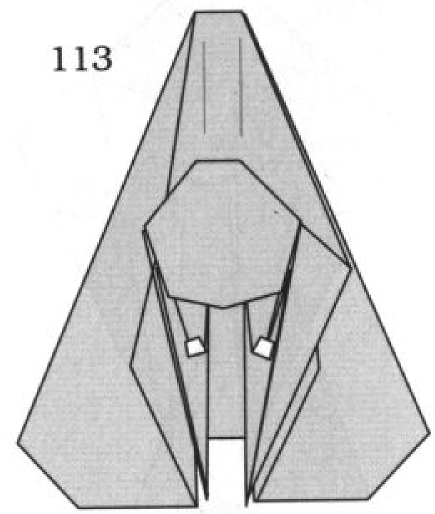
111



112

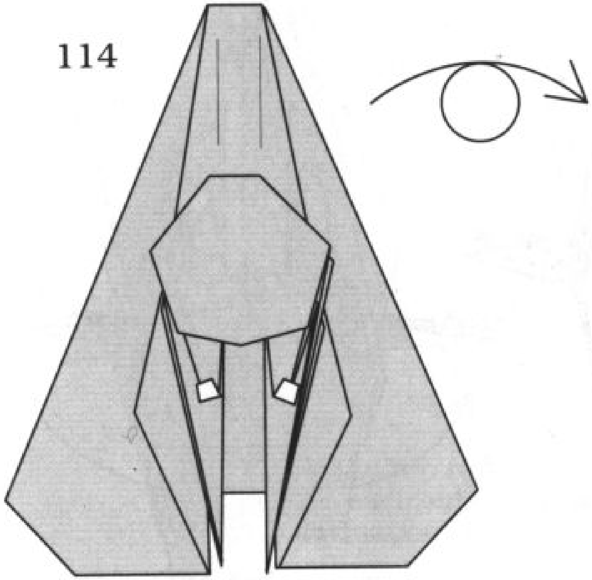


113

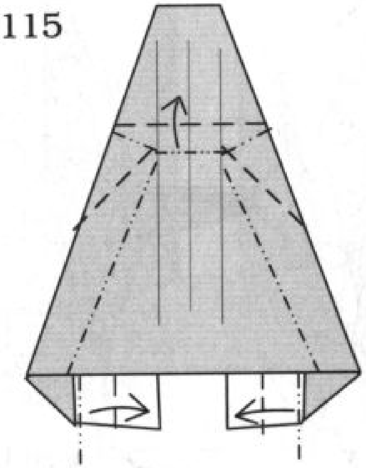


Repeat steps 108–112 on the right side.

114

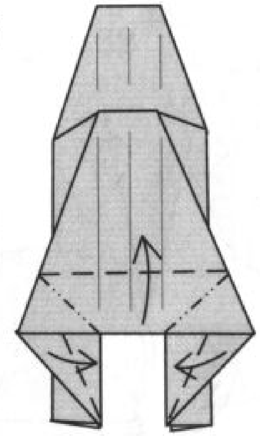


115



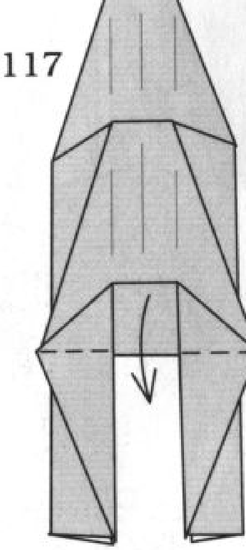
Refold on the creases.

116

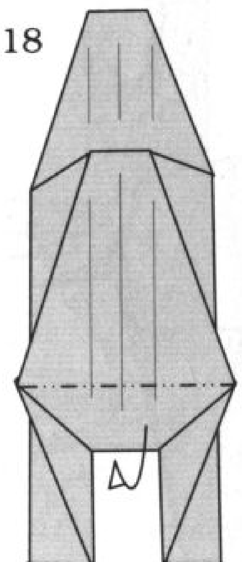


Petal-fold.

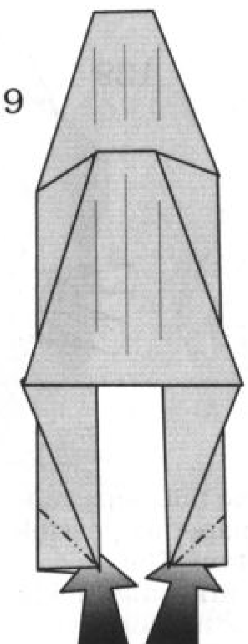
117



118

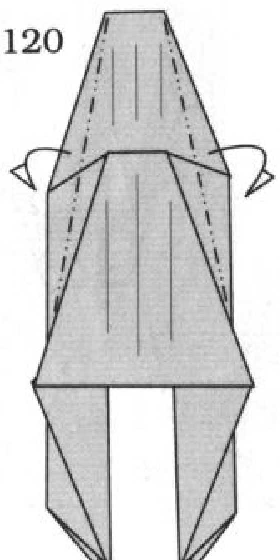


119

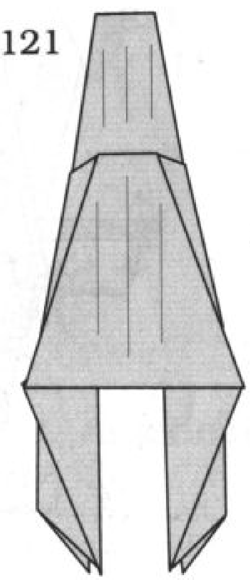


Two reverse folds.

120

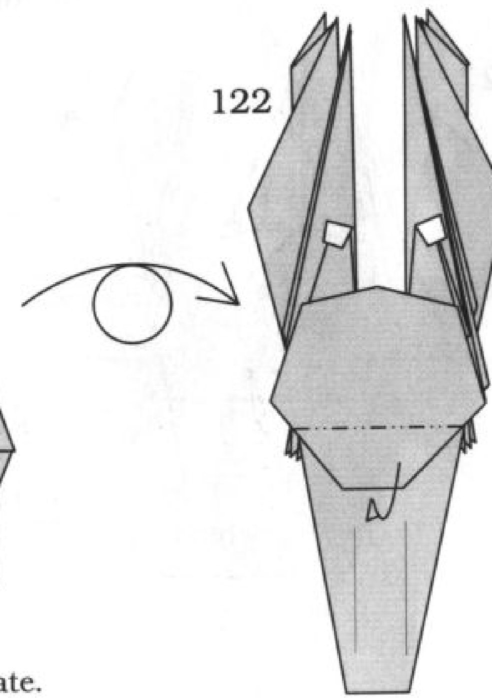


121

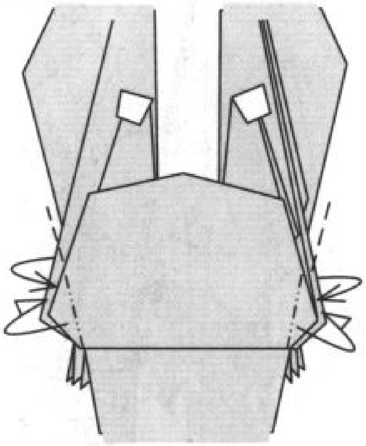


Turn over and rotate.

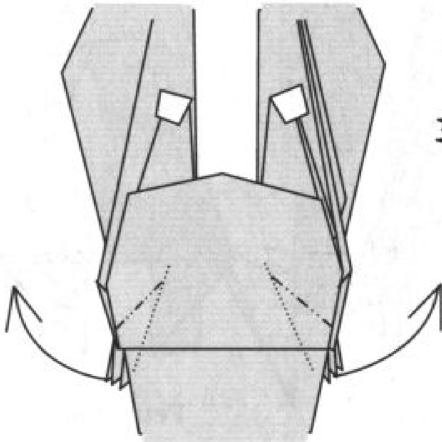
122



123

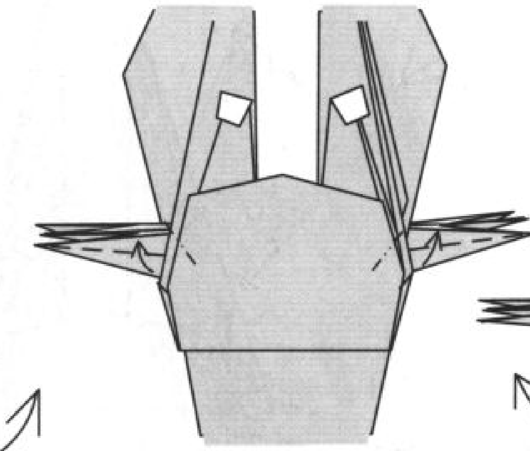


124



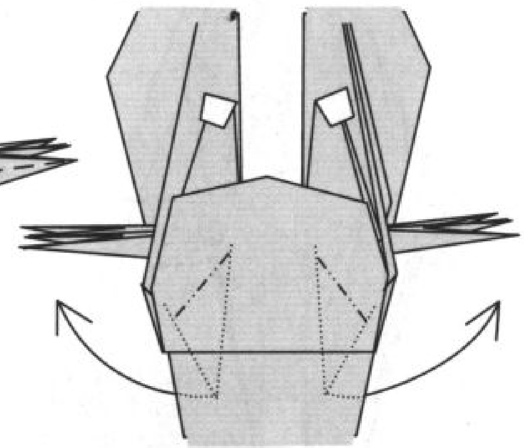
Reverse-fold three corners together on each side.

125



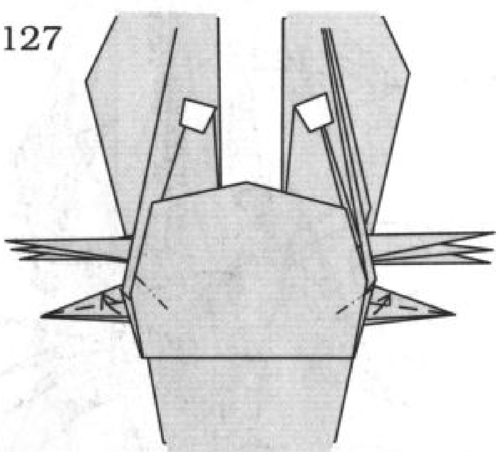
Repeat behind.

126



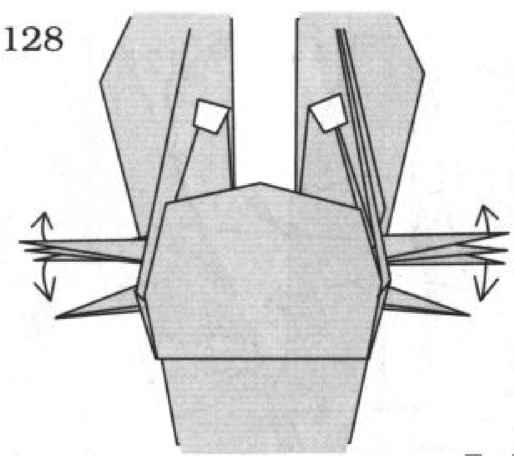
Two reverse folds.

127



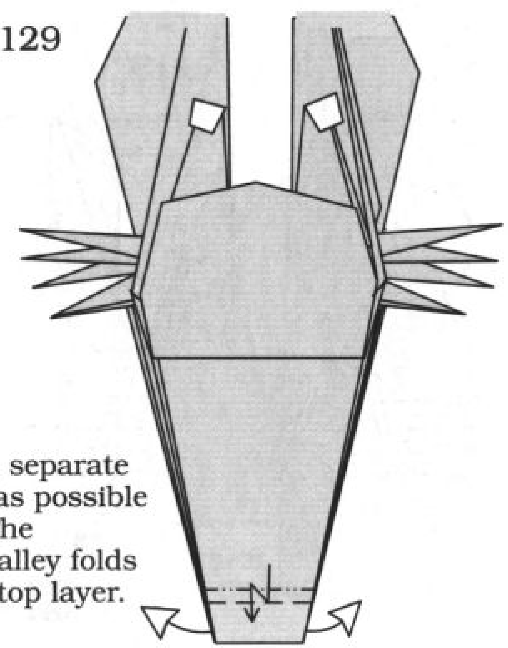
Repeat behind.

128



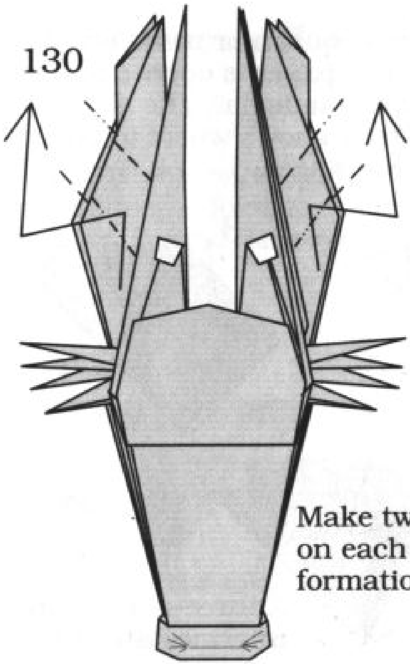
Separate the three legs on each side.

129



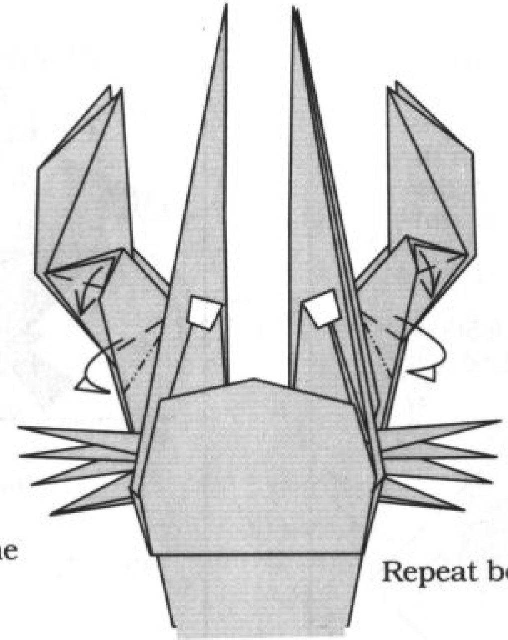
To form the tail, separate as much paper as possible at the bottom. The mountain and valley folds are only for the top layer.

130



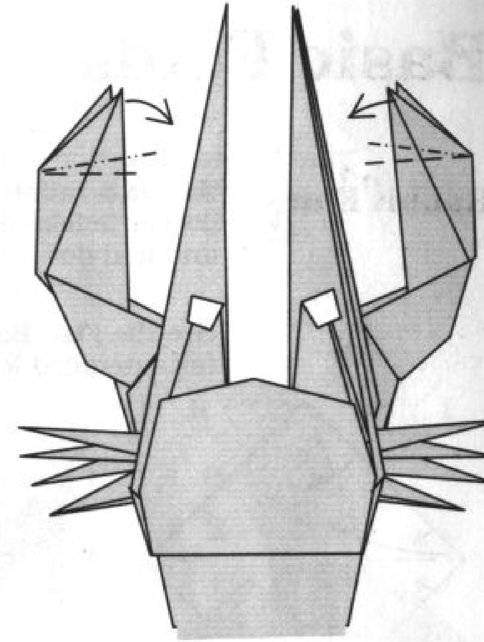
Make two reverse folds on each side to begin the formation of the claws.

131

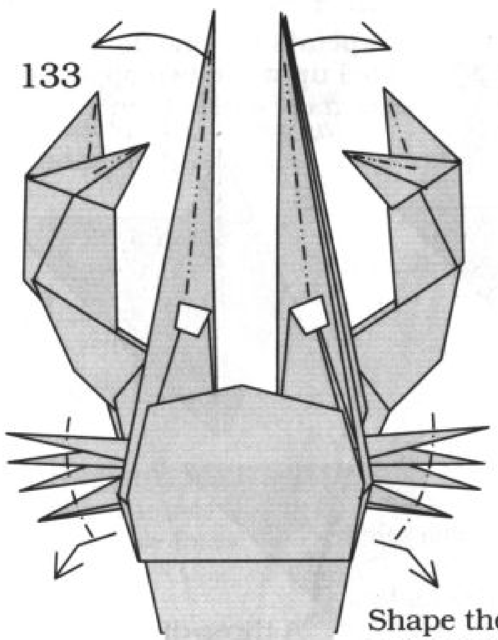


Repeat behind.

132

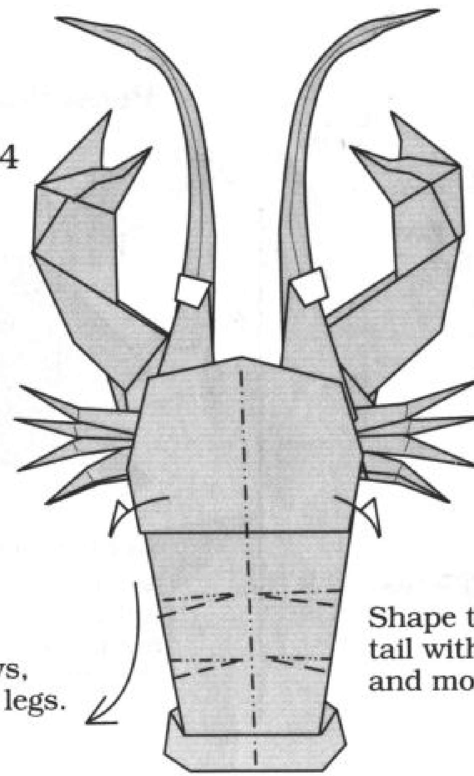


133



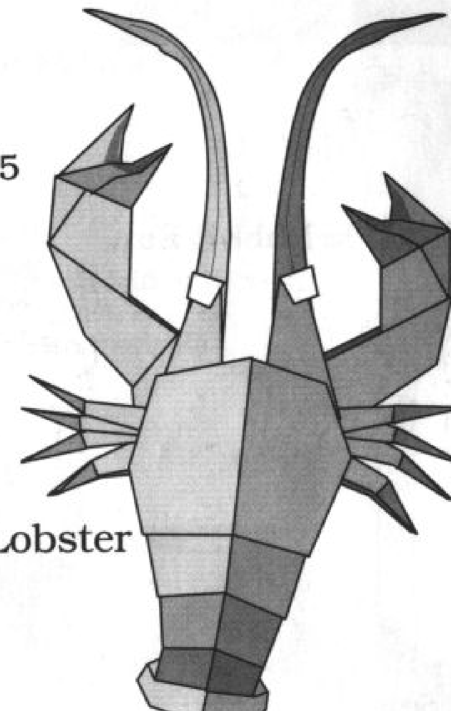
Shape the claws, antennae, and legs.

134



Shape the body and tail with simple valley and mountain folds.

135



American Lobster